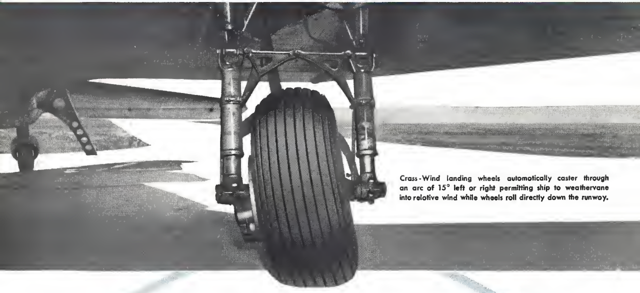
AVIATION WEEK

MAR. 7, 1949

A McGRAW-HILL PUBLICATION



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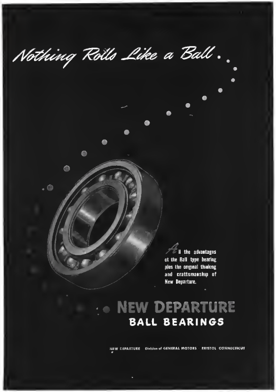

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AVIATION WEEK

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NEWS SIDELIGHTS

Skycoach Success

Pan American Airways' coach service between New York and Puerto Rico is raising hob with nonskeds flying the route

In a list compiled last year for CAB, PAA listed 57 uncertificated operators active on the Puerto Rican run during 1947 or the first part of 1948 But now, one of the nonskeds reports, only about six irregular operators are still in business, and practically all of these have been accused by CAB of flying too frequently in violation of the non scheduled exemption

Meanwhile, Eastern Air Lines, which must fly from New York to San Juan via Miami, indicates it will offer 4 cents a mile DC-4 coach service if it is permitted to operate nonstop

Subsidy Law

Enactment of legislation requiring separation of "service" from "subsidy" mail payments to airlines by Congress this session is a virtual certainty. The proposition has strong bipartisan support and was given a boost by the Hoover Commission's recent endorsement

Air Transport Assn last year vigorously fought the separation, but probably will not at this time Some efficiently-operated carriers have come around to the belief that finger pointing at the carriers that are "living off" the government would clear them of the onus, pave the way for mergers of uneconomic carriers, and be wholesome for the industry

At most, ATA is expected to offer only lukewarm opposition to separation

Transport Fight

There is evidence of a major realignment of interests in the transportation field

Air Transport Assn has joined hands with the Assn of American Railroads in the Transportation Assn of America, launching an all-out campaign to increase the economic stability of the transportation industry and ward off nationalization

Now there is considerable speculation in inside circles that National Independent Air Carriers, representing non scheduled air carriers, will join hands with the Federation of Railway Progress, headed by active railroadman Robert R Young

Joseph Borkin, Washington representative of the Federation, also represents NIAC A few years back, Young, who controls several roads as board chairman of the Allegheny Corp., stalked out of AAR with a barrage of criticism—"banker-controlled," "non-competitive," "unenterprising," "government subsidized"

Young's objections to AAR follow the line of NIAC's objections to ATA He has made slow progress, however, toward his objective of building up a coast-to-coast rail empire by purchases and crushing the "AAR trust." Justice Department has supported both Young's case and NIAC's case

Price Problem

President Truman's passing comment on the high cost of military aircraft at the USAF Andrews Field Congressional demonstration has had repercussions in the Pentagon

Since then, several generals concerned with procurement have been called on the Pentagon carpet and lectured on the need for economy in handling aircraft procurement funds and the taxpayers' dollars Some observers believe that the cost of military aircraft has risen higher than required by price rises in labor, materiel and increased complexity of design

Watch for increased emphasis on the need for a performance budget in the National Military Establishment that will detail investments in each type of military effort rather than the present system that made it impossible for the old Air Transport Command to compute the cost of its operations or give a clear idea of what any particular component of the services really costs the taxpayers

Lanphier for Whitney

Washington observers are watching for significance of the shift of Tom Lanphier, into C V Whitney's job as Assistant Secretary of the Air Force

Lanphier, a World War II fighter ace, former Air Force Assn president, and now a Boise newspaper editor, has been active in Air Reserve affairs and reportedly has the backing of Floyd Odlum and Jackie Cochran

Whitney has been under fire internally in USAF for his handling of Air Reserve matters Whitney, a former Pan American Airways director, will become Undersecretary of Commerce where he will be superior to both Assistant Secretary John Alison and CAA Administrator Del Rentzel. Grant Mason, Whitney's assistant in the Pentagon will move with him to the Commerce Dept

Fat Lobby

Two of the organizations reporting the biggest expenditures over the past year under the lobby registration provision of the 1946 Congressional Reorganization Act are Transportation Assn of America and Assn of American Railroads

TAA reported an expenditure of $273,194; and AAR, $126,639 TAA's legislative activities are directed by Clarence Lea, former chairman of the House Interstate and Foreign Commerce Committee, who makes a salary of $35,000 a year, and Donald Conn, who earns $50,000

TAA recently announced that it had engaged Dr John Frederick, former member of the professional staff of House Interstate, at a salary of $10,000 a year for part time work

Air Tramps

The "tramp" merchant marine of the air envisioned by former CAB Chairman James M Landis is gradually being developed on a world-wide scale by U S certificated and noncertificated airlines

Pan American's C-46 cargo operations to Latin America are taking a leaf out of the newspaper adventures of Steve Canyon

Some other operators, such as Alaska Airlines, Seaboard & Western, Transocean and Trans-Caribbean, which are barred by CAB regulations from making common carrier passenger flights from the U S to other countries, have developed a flourishing business flying from foreign point to foreign point Establishment of the new state of Israel has resulted in unpublicized contracts for the transportation into Haifa of Jews from Europe, Aden (Arabia) and China

Trans-Atlantic contract flights in support of U S military commitments in Europe are expected to continue at least through this fiscal year Development of President Truman's "global fair deal" presumably would open new horizons for tramp operations

AVIATION CALENDAR

Mar. 7-10—Institute of Radio Engineers Convention, Hotel Commodore, New York City.

Mar. 10—Joint meeting New York section IAS, SAE, McGraw-Hill Building Auditorium, 330 W. 42nd St., New York City.

Mar. 10-12—Annual meeting of American Society of Tool Engineers, Hotel William Penn, Pittsburgh.

Mar. 10-12—Seventeenth annual meeting, American Society of Tool Engineers, Hotel William Penn, Pittsburgh.

Mar. 13—Air show and aviation review, Paradise Aviation Corp., Paradise Airport, Phoenix.

Mar. 14-16—Symposium on engineering research, Center for Continuation Study, University of Minnesota, Minneapolis.

Mar. 18—Annual national aircraft propulsion meeting, Hotel Carter, Cleveland, sponsored by IAS.

Mar. 22—ICAO African-Indian ocean air navigation meeting, Algiers.

Mar. 22-24—Air Transport Assn. annual airline engineering and maintenance conference, Continental Hotel, Kansas City.

Apr. 11-13—Society of Automotive Engineers national aeronautic and air transport meeting, Hotel New Yorker, New York.

Apr. 11-15—Western metal congress and exposition, Shrine Convention Hall, Los Angeles.

Apr. 11-15—Western Metal Congress and Exposition, sponsored by American Society for Metals, Shrine Civic Auditorium, Los Angeles, Calif.

Apr. 19-20—Magnesium Assn. annual spring meeting, Edgewater Beach Hotel, Chicago.

Apr. 19-20—Fifth annual meeting of the Magnesium Assn., Edgewater Beach Hotel, Chicago.

Apr. 19-21—AIEE southwest district meeting, Baker Hotel, Dallas, Tex.

Apr. 24-27—American Assn. of Airport Executives convention, Oklahoma City.

Apr. 29-30—Sixth IAS personal aircraft meeting, Hotel Allis, Wichita.

May 2-4—2nd annual meeting of the Airport Operators Council, Denver.

May 12—National Fire Protection Assn. committee on aviation and airport fire protection, Fairmont Hotel, San Francisco.

May 18-21—Society for Experimental Stress Analysis spring meeting, Hotel Statler, Detroit, Mich.

May 23-24—Annual meeting of the Magnesium Assn., Edgewater Beach Hotel, Chicago.

May 23-26—Eighth national conference, Society of Aeronautical Weight Engineers, Inc., Biltmore Hotel, Dayton.

May 24-27—Second joint conference of IAS, Royal Aeronautical Society, Hotel Astor, New York City.

June 3-12—Sixth annual Michigan Aviation week.

June 4-5—Fourth annual air fair and industrial exposition, Shawnee, Okla.

June 20-24—AIEE summer general meeting, New Ocean House, Swampscott, Mass.

PICTURE CREDITS

12—USAF; 13—Republic; Wide World; 15—Piasecki; 36—Pratt & Whitney; 39—PAA.

NEWS DIGEST

Global Nonstop Flight

An Air Force B-50 last week completed the first nonstop flight around the world, refueling in flight four times during the course of the 23,450 mi., 94-hr journey Flight was an operational training mission of Strategic Air Command and began and ended at SAC's Carswell Air Force Base, Ft Worth, Tex

The plane was refueled by B-29 tankers (AVIATION WEEK, Feb 21) over the Azores, over Dhahran, Arabia, over the Philippines and the last time above Hawaii An operational combat plane drawn from the 43rd Bomb Group, the B 50 was piloted by Capt James Gallagher and carried a crew of 13 It was armed with 12 50-caliber guns, but no ammunition or bombs Fuel tanks were installed in the bomb bay

DOMESTIC

Personal aircraft shipments in January of ten companies reporting to Aircraft Industries Assn numbered 152, valued at approximately $796,000 Four-place planes numbered 113, two place, 39 Cessna topped the month's sales with 54

Caroline Mars, Navy flying boat, twice broke record for number of persons carried aloft in airplane On one trip from Alameda Naval Air Station (near San Francisco) to San Diego, it carried 207 On return hop, it carried 222 Previous high was 169, carried by German Dornier DOX in 1929

FINANCIAL

Ryan Aeronautical Co reports profit of $356,603, after taxes, for fiscal year ended Oct 31, 1948, on sales of $7,948,411 Backlog was $11,700,000

Bendix Aviation Corp. reports earnings of $3 102,625 for the first quarter of its fiscal year, ending Dec 31, 1948, on income of $49,586,998 Both earnings and sales were substantially above those for the same period of the preceding year Backlog on Dec 31 was $157 million.

FOREIGN

Peruvian International Airlines suspended operations and went into voluntary bankruptcy on petition filed in U S District Court in New York City by group of small creditors Future of line is in doubt until bankruptcy hearing, sometime within week or ten days Reportedly, debts total about $4,800,000 against assets of between $2-4 million

INDUSTRY OBSERVER

► Convair's XC-99 transport, world's largest landplane, will probably wind up in Strategic Air Command as a transport unit for support of the mobile long range striking force now being built around Convair's B-36B and the Boeing B-50.

► Northrop's XF-89, all weather twin-jet fighter, is now undergoing extensive flight testing at Muroc The giant fighter, which weighs more than a fully loaded DC 3, has a top speed of better than 625 mph

► Boeing's XB-47 Stratojet bomber will undergo some redesign in its production version This version will follow the present order for 10 of the six-jet bombers off the Wichita plant's production line and will have a gross weight boosted from the present 125,000 lb to close to 200,000 lb Bulk of the added weight will be to accommodate additional fuel and the structural beef-up

► Several new versions of the omni range type navigational aid are now nearing flight test stage. These new type omni-ranges have solved several of the accuracy problems still puzzling the Civil Aeronautics Administration Technical Development Center at Indianapolis and offer promise of far greater accuracy than has been possible with the CAA-developed omni-range

► De Havilland Aircraft of England has signed a contract with the Swiss government to license manufacture of 100 twin jet de Havilland Vampire fighters in Switzerland. Swiss will build the Vampire-6 powered by a Goblin engine with 3300 lb static thrust In addition the Swiss will buy 75 Vampire-6 fighters from de Havilland's British plant

► Canadair Ltd of Montreal is interested in building the Douglas DC 6 with either American or British made engines Canadair will complete its present orders for the Canadair Four before summer This transport is now selling for $735,000

► Air France is watching the test program of the French SE 2010, 140,000 lb airliner scheduled for use by that airline on its international trunk routes. The SE 2010 is powered by four 3500 hp engines and has a fuel capacity of 7000 gal It will carry 108 passengers in seats or 60 in berths on the version design for trans-Atlantic service and 160 passengers on a version to be used on shorter hauls in Europe and Africa

► Navy is studying the possibility of using a single electronic computing machine, centrally located, to handle the entire radar warning net around the U S Device would not only receive and interpret detection data from the net but would automatically calculate interception courses, dispatch fighter units, alert others etc The device, as contemplated, would plot intercept vectors continually according to the changes in course altitude or speed of the enemy attack Some experts foresee little practical difficulty in the design of such a machine, which would comprise the long-awaited central fire control station for future "push button" warfare

► U S Geological Survey, Dept of Commerce, has contracted for the operation of three helicopters in Alaska during the summer completing the aerial mapping job begun last summer. Stewart Sales Corp, Indianapolis, Ind., will operate two Bell helicopters in the vicinity of Anchorage A-F Helicopters, Los Angeles, will operate one Bell helicopter in the Juneau area. Coast and Geodetic Survey is also asking for bids to be opened Mar 15 for mapping operations throughout Alaska. CGS is asking alternately for one four-place or two two-place helicopters.

► High security classifications covering some guided missile production contracts now being issued are presenting problems to some West Coast airframe plants, whose production officials technically can't discuss contract details with anyone but who must do so in letting component subcontractors know what their accessories needs will be Aircraft factories which previously have been delivering "hand made" experimental missiles to military services now are beginning to plan mass quantity production lines

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Convair's Delta wing Model 7002.

USAF Reveals 3 New Supersonic Planes

Latest jet-rocket fighters show results in field of high speed flight research.

By Robert McLarren

Translation of supersonic flight research into combat aircraft is revealed in a trio of new U. S. Air Force supersonic interceptors. These three new planes are the Lockheed XF-90, Republic XF-91, and an experimental flying model used in the Convair XF 92 project.

▶ **Supersonic Program**—The three aircraft represent a design program aimed at covering the most promising solutions to the supersonic speed problem. All have two features in common: a wing designed to alleviate the wave drag of supersonic speed, and composite turbojet-rocket power. Some borrowing from German wartime research is inevitable in the designs but substantial refinement in detail together with a wholly U. S. contribution—inverse taper—is contained in the designs.

Lockheed's XF 90, most conventional of the three, features thin, swept wing, two Westinghouse 24C turbojet engines and two 1000 lb. thrust rockets for short-duration acceleration. With a sonic top speed, highly producible structure, and a designed-for-the-purpose equipment layout, it is believed to hold first preference in the procurement picture. Prototype is nearing completion at Burbank.

▶ **Inverse Taper**—Republic's XF-91 is a radical departure from familiar high speed design and features inversely tapered wing in which the tip chord is substantially greater than the root chord. This wing is designed to solve the perplexing problem of premature tip stalling at low speed of the conventional swept wing. By shifting the lift distribution tipward, Republic engineers—led by chief engineer Alexander Kartveli—believe they have solved the problem of preserving aileron control at near stalling speeds, when it is needed most.

The increasing tendency towards thin wing profiles has increased the problem of stowing the main gear and recent tendency has been to use thin, large diameter wheels. Republic engineers switched to small, tandem wheels in each main gear alleviating the stowage problem while increasing the footprint area on soft runways.

Problems of structure and fuel capacity necessitated the stowage of the retracted gear outboard near the wing tip, which aggravates the wing structural design problem.

▶ **Rocket Motors**—Internal layout of the XF 91 is similar, generally, to the F-84 Thunderjet fighter, with the intake duct bifurcated around the pilot and rejoined forward of the General Electric J-47 turbojet engine developing nearly 6000 lb. thrust with water injection. Alternately, the engine may be an Allison J-35 which, with water injection, produces 5500 lb. thrust. In addition, four rocket motors are mounted in a vertical arrangement at the extreme tail of the airplane, two above and below the turbojet tailpipe. These rockets can be used either for takeoff assistance or for highspeed acceleration at sonic speed.

XF-91 has a span of about 30 ft. and is more than 45 ft. long. It weighs 15-20,000 lb. and has a maximum speed of Mach number 1.0. It is equipped with pressurized cabin, seat ejection, simplified cockpit layout and two 20mm cannon, mounted in the nose. Upon completion of taxi tests at Republic's Farmingdale, L. I. plant, it will be

Striking views of Republic's XF-91

loaded aboard an Air Force transport and flown to Muroc Air Force Base, Calif. for initial test flights by Carl Bellinger, Republic chief test pilot.

▶ **Delta Wing Model**—Although the Delta wing Convair Model 7002 is a revised flying mockup, the tiny craft represents USAF and Convair design thinking on the XF 92 jet-rocket fighter, further development of which has been cancelled. The original design, with an estimated top speed of 1165 mph., or Mach No. 1.75, was to have been powered by a ramjet engine with a series of ducted rocket motors for takeoff and acceleration to supersonic speed. This rocket installation makes use of a jet augmenter tube, similar to that used on the Convair-Liner exhaust system, to accelerate air into a highspeed jet that produces additional thrust over that of the rocket alone.

▶ **Seek Data**—In addition to the complex development problems posed by the radical powerplants, the problem of the Delta wing was not thoroughly understood and it was decided to build and test a flying mockup of the design to obtain stability and control data on the Delta wing configuration. The resulting research airplane is the Convair Model 7002, which has made more than 20 successful test flights.

Model 7002 is powered by an Allison J-33 centrifugal-flow turbojet engine developing 5200 lb. thrust with water injection. Since it is to be used only for low speed (400-450 mph.) stability tests, rockets are not fitted.

▶ **Aids Construction**—The Delta wing is a logical conclusion of the effect of combined sweepback and low aspect ratio, which must be used in combination as the sweep angle is increased. It also reduces the structural problem posed by large sweep angles by permitting a straight, lateral spar across the trailing edge. This spar provides the stiffness required to prevent wing torsion from changing the local lift coefficient and thus compromising the efficiency of the wing.

By sweeping back the wing to 60 deg., the critical Mach number is raised well into the supersonic realm and the drag rise of supersonic speed is delayed and alleviated. These highspeed advantages are accompanied by serious low speed problems that are now being explored by the Model 7002. Although the Delta wing configuration is not subject to the tip stall propensities of the simple swept wing, it presents severe low speed stability difficulties. One of these is an extremely high stalling angle that may require the pilot to nose the airplane up as high as 30 deg. before touchdown in order to obtain maximum lift and, therefore, minimum landing speed. The Model 7002 is provided with a heavy tailskid to prevent damage to the jet tailpipe during such high angle landings.

▶ **Tailless Problems**—Location of the control surfaces along the trailing edge

precludes the use of flaps with a further reduction of maximum lift The two trailing edge surfaces act as elevators when moved in unison and as ailerons when operated differentially The Delta-wing layout thus takes on many of the problems of the tailless airplane, with the exception of directional stability, which is provided by a large, swept fin and rudder

The Model 7002 is of all-metal construction with a single nose air inlet for the turbojet engine The duct is bifurcated around the pilot and rejoined at the inlet to the engine impeller All fuel is carried in the fuselage, which restricts the 7002 to a very short duration of about 30 min Extremely close frame spacing has been used in the fuselage to provide shell stiffness

► **Ejectable Seat**—Pilot's seat is ejectable, canopy folding upward and rearward on hinges placed aft Wing structure features a front spar swept back with nose ribs normal to the leading edge and main ribs parallel to the fuselage reference line Control surfaces are fabric covered, making necessary external horn balances on the lower side of the elevator and the port side of the rudder

Long-travel oleo struts are used on the landing gear to absorb the high vertical impact loads of landing Nose wheel retracts forward into clam shell doors and the main gear folds outboard into the wing, where it is covered by large fairing panels upon retraction Model 7002 is completely instrumented as a research airplane with a multi-channel telemeter antenna mounted in the air separator of the intake duct Airspeed head is located atop the fin out of reach of the conical shock wave that would be created by supersonic flight of the craft

Air Force has no immediate plans for further development of the Delta wing configuration pending outcome of tests on the 7002

Hughes Flying Boat Damage Discovered

Serious damage of unknown origin has been discovered in the tail assembly of Hughes Aircraft Co.'s giant flying boat.

Howard Hughes told AVIATION WEEK that the interior structure of an elevator, rudder and ribs in one tab had been extensively damaged to a degree which would have been critical and could have caused a crash had it gone unobserved until resumption of flight tests

Extent of the hidden damage, found several weeks ago by workmen installing vibration test equipment, was disclosed last week Hughes has discussed the matter with the Federal Bureau of Investigation, but refused to say whether sabotage was suspected

Taxi tests of the flying boat may be resumed this month as soon as it has been equipped with new reversible-pitch Hamilton Standard propellers

During the year the plane has been in dock since its first flight, Hughes reportedly has spent approximately $2 million on modifications The Civil Aeronautics Administration office at Los Angeles indicates that up to 50 changes have been made.

Major changes include installation of a "flying tab" dynamic control system in addition to the boat's original hydraulic control system, reduction of eight throttles to four, replacement of pneumatic engine controls by electric controls, general revision of instrument panels and engineer's console, and installation of special flame seals on the flight deck to protect the pilot against smoke in event of fire inside the plane during flight

Schildhauser Resigns

Capt C H "Dutch" Schildhauser, USN (Ret), has resigned from the Glenn L. Martin Co to enter private consulting work He served as head of the Navy's flying boat design branch during World War II and was serving in the sales department of Martin at the time of his resignation

Skycoach Expansion

Capital Airlines is seeking CAB permission to expand its highly successful skycoach operations.

The company, which inaugurated low-cost New York-Pittsburgh-Chicago flights last November (Nighthawk route), now plans to provide similar service between New York and the Twin Cities via Pittsburgh, Cleveland, Detroit and Milwaukee starting Mar. 24, and between Washington and Chicago via Pittsburgh, Cleveland and Detroit starting Apr 1 Like the original Nighthawk operation, Capital's new skycoach flights will leave their terminals between midnight and 2 am. Fifty-nine passenger DC-4s will be used, and fares will be about 4 cents a mile

Northwest Airlines has asked CAB authority to open skycoach service between New York and Seattle via Minneapolis and other points on Mar 24 with 56-passenger DC-4s (AVIATION WEEK, Feb. 21). Thus Capital and NWA may soon be competing for tourist-class business on the New York-Twin Cities run.

Military Deliveries Rose in 1948

Military aircraft production rose steadily during 1948 according to delivery figures of the U S Air Force and Navy

Total military production increased from 11,400,000 lb of airframe weight during 1949 to 25,143,500 lb in 1948 Monthly deliveries to the services rose in a steady curve during the year to a peak of 3,276,600 lb for December, 1948 These deliveries reflected only slightly the increased aircraft procurement funds voted by the final session of the 80th Congress in the spring of 1948.

Bulk of the deliveries under that program will be reflected in deliveries during the last half of 1949 and reach a peak in 1950

Following are the 1948 monthly deliveries of military aircraft to both USAF and Navy expressed in airframe lb

Jan	1,253 600
Feb	1,464 800
March	1,267,700
April	1,207 900
May	1,425,600
June	2,837,000
July	2,363,600
Aug.	2,660,100
Sept	3,002 600
Oct	1,738,000
Nov	2 646 000
Dec	3 246 000
Total (lb)	25 143 500

Andrew Willgoos Dies, P&W Chief Engineer

Andrew V D Willgoos, 60, chief engineer, Pratt & Whitney Aircraft, died suddenly of a heart attack while shoveling snow at his suburban Hartford, Conn , home

The noted engine designer was one of the original employees of Pratt & Whitney, joining its founding members in 1924 in the design of the first "Wasp" engine He continued as chief research and design engineer throughout his long period of service

Although titled chief engineer, Willgoos devoted all of his time to "dreaming" new and more powerful powerplants as director of a small experimental design group He was personally responsible for the wartime Double Wasp and the Wasp Major first four-banked 3000 hp. aircooled engine to reach production Andrew, and his brother Thomas, who became P&W chief of production during the war were sons of immigrants, acquired skill as master machinists, and preserved their interest in precision machine work throughout their careers

New Helicopter Sets Speed Mark

Seven-place Piasecki XHJP-1, designed for use by Navy on ships, achieves unofficial record of 131 mph.

A new unofficial helicopter speed record of 131 mph has been set by the Piasecki XHJP-1, a twin rotor experimental model designed for the Navy.

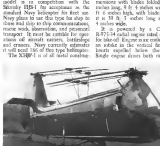
The XHJP-1 mark was set in runs over a calibrated course at Piasecki's Morton, Pa , plant Official world record is held by the British Fairey Gyrodyne at 124 3 mph American record is 114 mph set by a Sikorsky S-51

► **Fleet Competition**—Latest Piasecki model is in competition with the Sikorsky HJS-1 for acceptance as the standard Navy helicopter for fleet use Navy plans to use this type for ship to shore and ship to ship communications, rescue work, observation, and personnel transport It must be suitable for operations off aircraft carriers, battleships and cruisers. Navy currently estimates it will need 166 of this type helicopter

The XHJP-1 is of all metal construction to reduce vibration and features tandem counter-rotating rotors fore and aft and a large vertical fin for directional stability It carries a crew of two and five passengers and is equipped with internal rescue hatch and hydraulic lift for hoisting litters directly into the cabin

► **Fits Elevators**—Overall dimensions are designed to fit any carrier elevator without folding rotor blades and any cruiser elevator with blades folded Dimensions with blades folded 31 ft 7 inches long, 9 ft 4 inches wide and 12 ft 6 inches high, with blades extended it is 39 ft 3 inches long and 30 ft 4 inches wide.

It is powered by a Continental R-975-34 radial engine rated at 525 hp for take-off Engine is air cooled through an intake in the vertical fin with exhausts expelled below the fuselage Single engine drives both rotors Flat



Ground view of the XHJP-1

rotor blades are made of steel tubing with plywood covering Twisted all metal blades will be added to later models with an expected increase in top speed to 145 mph

► **Cruise at 114 Mph.**—Present cruising speed is 114 mph at 75 percent of power The XHJP-1 has gone into successful auto-rotation at 126 mph It has a 1600 fpm rate of climb and has flown up to 16,000 ft

Crew seats are mounted side by side in the nose Design was begun in late 1945 with the first model flying in March, 1948 Two models are currently at Naval Air Station, Patuxent, Md , where they have been undergoing evaluation tests with the Sikorsky HJS-1 Navy decision on the fleet type helicopter is expected around Mar 15

► **Easy Maintenance**—The XHJP-1 features built-in steps for easy access to all parts of the fuselage and blades and numerous access panels for simplified maintenance The power package can be changed as a unit Configuration of the fuselage was designed for simple manufacturing requiring only single curve skin forming for most of the external parts

The XHJP-1 is also a flying scale model of the XA-16, a U S Air Force experimental transport helicopter with detachable fuselage

Election Void

Results of a union shop authorization election lost by the CIO United Automobile, Aircraft and Agricultural Implement Workers at four plants of North American Aviation last August have been set aside by the National Labor Relations Board

Reason the election, conducted by mail, was mismanaged by the regional NLRB director Many employees did not get ballots, and little more than half the workers voted

This was detrimental to the union's interest because, under the Taft Hartley law, a majority of the eligible employees have to approve before the union may bargain for a union security clause in its contract The vote was 6314 to 2457 for a union shop, but since 15,532 were eligible, the 6314 favorable votes was 1453 short of the necessary number

Goodyear Plant

Goodyear Tire and Rubber Co has announced plans to open its plant at Litchfield, Ariz , for the manufacture of gas envelopes for the prototype of the N type blimp to be built for the Navy

Operation will employ about 100 women, and is expected to be a forerunner of an expanded program, A J Thomas, Goodyear company president, reported

CAB to Wipe Out Airline Losses

New policy statement lays down heavy 1949 program including studies of routes, feeder life, freight rates.

By Charles L. Adams

For the first time in over two years, the nation's scheduled airlines are flying above the financial overcast

The Civil Aeronautics Board, in perhaps the boldest action of its history, has moved to wipe out the domestic carriers' 1948 losses and has charted a 1949 program for fostering sound economic conditions in the industry CAB acted to strengthen the airlines following White House scrutiny of the Reconstruction Finance Corp 's study of the carriers' short and long-term financial requirements

▶ **WAL, NEA Probed**—Besides offering six domestic trunklines and a feeder $7,808,000 in retroactive mail pay, it·

• **Instituted investigations** into the route systems of Western Air Lines and Northeast Airlines similar to the dismemberment proceeding now underway against National Airlines The Board will determine whether mergers with other carriers, purchases, modifications or interchange agreements

• **Announced plans** whereby TWA, American, United, Northwest and other carriers which suffered heavily when Constellations, DC-6s and Martin 2-0 2s were grounded will have their losses amortized through mail pay

• **Warned feederlines** which have not activated their routes that they will be ordered to show cause why their authorizations should not be terminated Short-haul carriers now in operation will be offered a five year renewal of their certificates, with possible modifications, if satisfactory progress is apparent other feeders will have to show cause why their franchises should not be terminated upon expiration

• **Launched a probe** to determine whether because of uneconomic conditions the public interest requires alteration, amendment, modification of suspension of certificates authorizing service between Chicago and Washington, between Washington, Detroit and the Twin Cities and between New York and Detroit By July, the Board hopes to complete a thorough study of the domestic route pattern so that remedial action can be taken on other links where competition has proved excessive

• **Ordered an investigation** into the reasons for differences in mail pay requirements of the "Big Four"—American, Eastern, United and TWA—to determine to what extent, if any, these differences may be occasioned by uneconomical and inefficient management, and to explore remedial action to be taken by the Board or the carriers to decrease dependence on subsidy

• **Began a study** to determine the feasibility of additional joint use by the certificated trunklines of ground operation, traffic, sales and other facilities to promote more economical and efficient service and decrease the need for subsidies

• **Initiated an investigation** into the cost to the domestic trunklines of carrying mail and into the factors which enter into the determination of fair mail pay

• **Declared it would explore** the possibilities of air coach operations The Board said it would expedite its current cases involving new first and second-class services to Alaska and Puerto Rico and would set down for early hearing applications for certificates to conduct regular transcontinental coach flights

• **Reported that** Board officials and RFC will maintain close cooperation with respect to airline financial needs so that consideration of loan applications may be expedited

• **Authorized a survey** to determine whether the Board should prescribe just and reasonable class rates for airfreight and to determine what the class rates should be Decision on the airfreight route case should be issued this month

▶ **Action Applauded**—Industry reaction to the policy statement was favorable. W A Patterson, a severe critic of CAB during the past year, commended the Board for its positive and aggressive action. Air Transport Assn President Emory S Land told Aviation Week the Board's move holds great promise of strengthening and stabilizing the airlines—if the plans can be implemented with reasonable speed

In announcing its ambitious program for 1949, CAB said its principal objective is the "complete return by the air transport industry to a sound and profitable condition from which it can withstand the ordinary vicissitudes of economic fluctuations" The Board said the period of postwar readjustment is drawing to a close as indicated by the large degree of equipment replacement which has occurred, the increasing stabilization of air traffic, and by the fact that transitional operating deficits are being progressively offset by operating economies and mail pay adjustments

▶ **Mail Pay Awarded**—Eight of the 16 domestic trunklines—Braniff, Capital, Chicago & Southern, Colonial, Continental, Delta, Eastern and Inland—showed operating profits for 1948 prior to CAB's latest series of orders And Mid-Continent has been offered a new mail rate that will put it well in the black

Among the carriers still showing deficits, CAB proposed granting United Air Lines $2,902,000 in retroactive mail pay, TWA $2,748,000 Northwest $1,134,000, National $337,000, Northeast $305,000 and American $233,000 In addition, Challenger Airlines, a feeder, was offered $149,000 more mail compensation to relieve its critical financial condition

▶ **Grounding Costs Amortized**—CAB admitted it had been wrong in believing that grounding costs of new aircraft types would not be of such magnitude as to require special mail pay allowances for their reimbursement

According to rough estimates by CAB, TWA lost at least $2 million as a result of the Constellation grounding in 1946, while American and United lost similar amounts when their DC-6s were grounded late in 1947 and during most of the first half of 1948 The Board will amortize the grounding costs over a five-year period, paying $400,000 annually as a special temporary mail rate to each of the three carriers Losses suffered by NWA in the 2-0 2 grounding have not yet been determined

▶ **Strike Losses Studied**—The $337,000 in additional mail pay offered National Airlines does not include an allowance for losses attributable to the 10 month-long pilot strike last year CAB said it is not yet prepared to consider the question of whether deficits incurred by carriers as a result of labor disputes will be allowed for rate-making purposes But NAL's new temporary mail rates do include compensation for the DC 6 grounding

Turning to the feeders CAB said the entire short-haul program will be re-examined during the coming year It emphasized that until it can be determined which feeders should be continued, all of the carriers are entitled to adequate government support

▶ **RFC Assistance Needed**—The Board believes that some domestic or overseas carriers are in need of interim financial assistance other than that which can properly be provided through mail pay. Aid cannot now be obtained from equity financing or private loans

Because of this situation, CAB is looking to the Reconstruction Finance Corp for help (A) through loans to carriers to provide working capital and to finance the purchase of new equipment and facilities and (B) through participation in voluntary financial reorganizations involving refunding of certain indebtedness or other adjustments in a carrier's financial structure The Board expects some airlines to ask for RFC loans "in the near future"

Royal Pakistan Air Force cadets now in training are shown at the Craig Field, Fla , base of Hawthorne Flying Service Pakistan flag flies with U S colors.

Pakistan Airmen Get U. S. Training

Hawthorne Flying Service has contingent of 22 cadets studying seven-month advanced flying course.

Halfway round the world from home, 22 cadets of the Royal Pakistan Air Force are taking a flight course at Hawthorne Flying Service's Craig Field base, Jacksonville, Fla.

The Hawthorne-Jacksonville cadet course is an interesting flight training phenomenon in the U S in 1949, although back in World War II days, Beverly Howard's Hawthorne school and many other civilian flight schools gave primary flight courses to approximately 200,000 AAF pilots.

Howard's wartime school at Orangeburg, S C , was the last civilian cadet school to close It operated from Oct 4, 1941, to Oct 13, 1945, and trained 5924 American and French aviation cadets during that period

▶ **More Classes Seen**—Ken Brugh, Hawthorne Jacksonville manager, and Flt Lt Zafar Chaudry, of the RPAF, are directing the seven months course for the Pakistan contingent, which may be the first of several to be trained at Jacksonville

Hawthorne has provided five flight instructors for the Pakistanians, headed by Milton Weeks, flight director A ground school course is headed by Walter Clark

The contingent is divided into two groups of 11 men each One group had received over 30 hr flight training on Tiger Moth biplanes before leaving Pakistan Second group had received four hours flight training on the Tiger Moths

▶ **AT-6s Used**—At Jacksonville the more advanced group has started out directly in North American AT-6 type trainers and will get from 150-170 hr. flying time in these planes during their course The less experienced second group takes from 25-40-hr time in Boeing PT-17 biplane trainers and then graduates to a 150-170-hr course in AT 6s

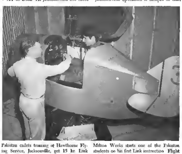
Flight curriculum for the Pakistan cadets includes day, transition, and night flying, night and day formation flying, and tactics

Ground school course includes over 200 hr classroom instruction with 15 hr Link trainer time for each cadet. Before a cadet graduates he will have a thorough instrument flight course, including 39 hr under the hood Of this, 15 hr will be Link trainer time

▶ **Course Comparison**—Beverly Howard, president of Hawthorne, says the course is planned as comparable to the USAF and RAF single engine advance training course for cadets Training of the Pakistan group is not as difficult as the wartime Hawthorne experience of training French cadets, since all the cadets accepted for the Pakistan course were required to speak good English

First group of 11 cadets is expected to be graduated June 10 and the second group July 10 The Pakistan students stay at Jacksonville Beach, seven miles from the airport, and commute by bus, reporting for duty at 7 30 am daily Curriculum allows time for drill and other military requirements

▶ **Other Hawthorne Activities**—In addition to being the only military cadet program carried on by a civilian flight training school in this country, the Jacksonville operation is unique in that



Pakistan cadets training at Hawthorne Flying Service, Jacksonville, get 15 hr Link trainer time. Above, chief flight instructor Milton Weeks starts one of the Pakistan students on his first Link instruction Flight training is in AT 6s

BRIEFING FOR DEALERS & DISTRIBUTORS

FARM AND BUSINESS SURVEY—A survey currently being made by the Personal Aircraft Council of Aircraft Industries Assn , among 2000 farm plane owners and 2000 business plane owners is expected to give the hard pressed manufacturers some additional insight into customers' requirements And a special question addressed to the users is likely to provide some additional evidence in support of GI vocational flight training. The question seeks to determine how many employers in the group addressed consider the ability to fly a plane an important qualification for prospective employes.

PURDUE SHORT COURSE—Next in the list of short courses in aerial dusting and spraying which have been conducted at various state schools in the winter season, preparing for greater volume of work this spring and summer, is the Purdue University two-day course Mar 10-11 at Lafayette, Ind

Subjects Insect, weed and disease problems, chemicals, uses and limitations, aerial equipment, legal aspects, CAA and state relations, use of the airplane in agricultural production, and a forum on operational problems of dusting and spraying by aircraft

EXCLUSIVE GASOLINE FRANCHISE—CAA is asking aviation industry comment on a proposed revision of regulations governing sale and delivery of gasoline and oil at airports participating in the Federal Airport Aid program The new circularization follows criticism of the existing Part 550 of Administrator's regulations, which allows airport sponsors to grant or exercise an exclusive right to sell aviation gasoline and oil on their airports but assures to all aircraft users on the airport the right to purchase gasoline and oil off the field to be delivered for their own use

It is provided however, that the airport sponsor may charge a reasonable fee representing services in connection with delivery of gasoline and oil Views of airport operators, fixed base operators, airlines, state, county and municipal associations and oil companies are asked in the circularizations

PIPER LANDING LIGHTS—Aircraft Accessories Co , which handles installations of optional extra equipment at Lock Haven for Piper airplanes is making available a CAA approved landing light installation for the PA 14 Family Cruiser and PA 12 Super Cruiser It will be installed in a new Family Cruiser before delivery at list price of $60 or a kit can be purchased for field installation at $36 list

Installation fits into leading edge outboard of propeller disc, and includes two sealed beam units—one directed for taxiing and one for landing, of 100 000 candlepower each

BENDIX RADIO SALES UP—Sales of Bendix personal plane radios for January, 1949, were 50 percent better than in the same month in 1948, J. W. Colvin, aviation radio merchandising manager for the Baltimore Bendix division informs Aviation Week Colvin said 75 percent of the radios were going into airplanes a year old or more.

He attributes the sales increase, which defies the down trend in new planes sales, to the fact that owners are seeking to get greater utility from their planes and see the need for radios. Colvin also reports that a sizeable portion of Bendix business is replacement for other makes of radios.

542 GOOO AIRPORTS—Certificates of "Good Airport Operating Practices" were awarded to 542 airports in 29 states, in the 1948 NAA airport contest Oddly, California, with the largest number of planes and pilots, qualified only one airport

Leading state was Indiana, with 93 airports Second was Nebraska with 72 airports Oklahoma ranked third with 56

National Assn of State Aviation Officials, American Assn of Airport Executives and Airport Operators Council cooperated with NAA in distributing the judging sheets to a total of 6000 airports Fields qualifying for the certificate were expected to comply fully with a specified list of required good practices, and to meet at least half requirements in a second list of desirable but not essential practices

—ALEXANDER McSURELY

it is being conducted in addition to the Hawthorne base's regular civilian aircraft service operations Craig Field is Jacksonville's Municipal Airport No 2, a wartime Navy auxiliary field, where Hawthorne installed its own facilities to take advantage of the paved runways inherited from the Navy

Hawthorne has a small administration building, restaurant, classrooms, administrative offices, a large 100x105 ft. hangar and a row hangar with 10 T-hangar stalls Here, in addition to the cadet program, Brugh carries on his regular airport service, gas and oil, shop, parts, supplies, and civilian flight training and charter service, following the routine of the ordinary fixed base operator

Iowa Clinic

More than 200 midwestern flight operators attended the aerial spraying and dusting clinic held in conjunction with the Iowa flight Operators Assn meeting is Des Moines recently.

Or Harold Gunderson, Iowa State College entomologist, advised that with proper timing the corn borer could be controlled with aerial spraying and pointed out that the ability of the airplane to cover large territories rapidly was important in attacking this pest Spraying in the midwestern area is needed principally for corn borer, grasshopper and weed control

Harry Lind, Iowa agriculture secretary, urged that pilots engaging in spraying and dusting be required to pass a simple examination on use of chemicals and their effects on various crops Committees were named to consider legislation and self-regulation by the operators

Earl J Howard, Ames, was elected president of the Iowa operators, with L A Straley, Clinton, as vice president and Virgil Cline, Shenandoah, secretary treasurer

Clinic was sponsored jointly by the operators, the Iowa Aeronautics Commission and Iowa State College

More Farm Flying

Rapid growth of agricultural aviation activities, including spraying, dusting and seeding, is seen in NATA analysis of records showing 779 flight operators in the U S—an average of approximately 16 to a state—now engaged in these activities

California leads the state with 96 operators, Texas is second with 82, and Florida third with 50 Other leading states Kansas, 47, Iowa, 35, Illinois 33, Arkansas, 29, Colorado, 28, Washington and Nebraska, 26 each

The analysis was made on a basis of CAA and Department of Agriculture figures, in connection with the operators' development of an agricultural activities division of NATA

Powerplant Failures—Causes and Cures

Analysis of lightplane engine mishaps points way to safer operation.

By Fred E. Weick*

One of the recognized problems of personal aircraft operation is the ever-present possibility of powerplant failure—particularly vital in night flying or under instrument conditions when it is necessary to reach a prepared airport.

The importance of the problem is highlighted by an analysis of personal plane engine failures during 1947, which indicates that the situation deserves a determined effort to improve the reliability of powerplants used in personal flying.

The study was limited to 1947 because it was desired to consider present-day engines as far as possible; and sufficient data to afford statistical significance were available from that single year.

The analysis was made possible by the cooperation of the Bureau of Safety Investigation of the Civil Aeronautics Board in furnishing the data, which includes all recorded powerplant failures, for engines up to 200 hp., leading to accidents involving at least major damage to the planes.

▶ **Basis of Analysis**—The study includes 1353 accidents—1/7 of the total of 9253 non-air-carrier mishaps recorded by the CAB for the year. Results of these 1353 accidents are summarized as follows:

- 1286 resulted in forced landings.
- 311 destroyed the planes.
- 80 involved serious injury to persons on board.
- 36 caused fatal injuries.

Thus, nearly all (94 percent) powerplant failures resulted in forced landings. One in four of the planes involved was a washout (completely destroyed). And one accident in each 12 caused either fatal or serious injury to persons on board. These figures indicate the relative seriousness of the accidents.

The proportions remain approximately the same for all of the various types of powerplant failure that occurred, including engine structure, fuel, lubricating, ignition and control sys-

*Director, Personal Aircraft Research Center, Agricultural and Mechanical College of Texas.

NON-AIR-CARRIER POWERPLANT FAILURES DURING 1947 (ENGINES UP TO 200 HP.)

Items of Consideration	Number	Suggested Remedy	Injury Index: Fatal	Injury Index: Serious	Injury Index: Minor—None	Damage: Washout	Damage: Major	Forced Landings
ENGINE STRUCTURE								
Crankcase Assembly								
Cylinder hold down studs failed	1	D			1	1		1
Crankcase nose section broke off	1	D			1	1		1
Subtotal	2				2	2		2
Cylinder Assembly								
Spark plug insert loose	1	B			1		1	1
Spark plug insert blew out	8	D		1	7	2	6	7
Cylinder failed	2	D			2		2	2
Subtotal	11			1	10	2	8	10
Piston Assembly								
Split	1	B			1		1	1
Wrist pin failed	5	D			5	2	3	5
Failed, undetermined	6		1		5	1	5	6
Subtotal	12		1		11	3	9	12
Connecting Rod								
Broke	9	D	1	1	7	5	4	9
Valves								
Stuck	5	D			5	1	4	3
Burned off	1	D			1		1	1
Stem broke	3	D			3		3	3
Swallowed by engine	1	D			1		1	1
Hydraulic lifter failed	1	D			1		1	1
Rocker arm failed	1	D			1		1	1
Failed, undetermined	1				1		1	1
Subtotal	13				13	1	12	11
Crankshaft Assembly								
Broke	5	D		1	4	1	4	4
Improper crankshaft gear installation	1	D		1	1		1	1
Subtotal	6			1	5	1	5	5
FUEL SYSTEM								
Fuel Leakage								
Tank	2	A			2	1	1	2
Faulty or broken fuel line	7	A		3	4	1	4	6
Broken gascolator	4	A			3	2	1	3
Subtotal	13			3	9	4	6	11
Restriction to or Below Normal								
Fuel Flow								
Contained water	51	A		4	47	14	37	46
Contained dirt	16	A	1		15	2	13	14
Clogged fuel line	3	A			3		3	3
Fuel tank strainer clogged	1	A			1		1	1
Gascolator screen plugged	1	A			1		1	1
Air tight gas cap not removed	1	A			1		1	1
Gas cap installed backwards	4	A		1	3		4	4
Air and/or vapor lock	3	D			4		3	3
Engine starvation due to failure of system to supply carburetor with fuel while supply is low	6	D			6	1	1	6
Subtotal	85		1	5	78	19	66	78
Primer								
Open	2	B			2		2	2
Worked loose	6	B			6	1	5	5
Subtotal	8				8	1	7	7

(Continued on page 22)

tems, propeller, accessories and undetermined failures.

▶ **Failure Breakdown**—A portion of the data furnished by CAB is given in the accompanying extensive tabulation. A brief recapitulation of the failures gives these striking divisions:

Fuel System	920
Engine Structure	53
Lubricating System	47
Propeller Assembly	19
Ignition System	18
Control System	12
Miscellaneous	5
Engine Accessories	3
Total Determined	1,077
Total Undetermined	276
Total	1,353

These figures show that ⅔ of the recorded accidents, and ⅞ of those of *known cause, were brought on by some failure of the fuel system*—obviously the most important part of the powerplant to be improved.

Of the remaining ⅛ of the determined powerplant failures not associated with the fuel system, about ⅓ were failures of the engine structure, a little less than ⅓ were failures of the lubricating system, and the remainder divided among the other parts of the powerplant.

▶ **Suggested Solutions** — Most likely remedies for these failures, in the opinion of the writer, are grouped in the following four classifications (most of the forced landings could, of course, have been avoided if the planes had been equipped with two engines and were capable of continuing a takeoff or flying away from a balked landing with one engine stopped):

A. Duplication of system (such as twin ignition, fuel or lubrication systems).

B. Change in basic methods (as from carburetor to fuel injection system, or elimination of item giving trouble).

C. Use of fuel system giving unmistakable warning when 1 hr. supply is left, and accurate indication of fuel quantity from that time on.

And where none of these remedies is applicable, apparently the only one left is:

D. Improved detail design, construction or maintenance.

Obviously, D will help nearly all types of mechanical difficulty, but it is listed here only for cases in which remedies A, B, or C are not applicable.

In the tabulation, the recommended remedies are designated by these letters for the individual types of failures listed.

▶ **Engine Structure**—Considering the individual items in the listing, we find that unless a suitable twin-engine arrangement is used, all of the power-

Items of Consideration	Number	Suggested Remedy	Injury Index: Fatal	Injury Index: Serious	Injury Index: Minor—None	Damage: Washout	Damage: Major	Forced Landings
Carburetor								
Ineffective carburetor heat	186	B		3	183	31	186	179
Nonapplication, or improper application of carburetor heat	256	B	1	19	231	12	214	254
Contained water	4	A	1	1	2	3	2	4
Contained dirt	6	A			6	1	5	6
Float loose	1	A			1		1	1
Float failed	3	A		1	2	1	2	4
Air intake clogged	3	A			1		3	3
Mixture control plate failed	1	A			1		1	
Needle valve worked loose	2	A			2		2	1
Improper idling adjustment	8	A		1	7		8	6
Failed undetermined	9	A	1		8	4	6	6
Subtotal	479		5	23	446	79	400	466
Fuel Valve Trouble								
Fuel selector handle shaft broke	1				1		1	1
Reserve tank knob came off	1	B			1		1	1
Selector valve stuck	1	B			1		1	1
Subtotal	3				1		3	3
Fuel Valve Nonuse or Misuse								
Failed to turn on fuel selector valve	1	B			1		1	1
Failed to close auxiliary valve when main tank overflowed	1	B			1		1	1
Improperly switched selector valve	6	B		1	5	1	3	6
Failed to switch from empty to full tank	26	B	1	2	21	10	10	26
Took off with fuel valve off or partially closed	14	B	1	3	10	1	10	14
Inadvertently turned off fuel selector valve	3	B			3		3	1
Subtotal	51		2	6	43	17	34	51
Confused Use of Fuel Valves or Carburetor Controls								
Confused fuel shutoff valve for carburetor heat	13	B	1		12	1	9	13
Confused mixture control for carburetor heat	3	B			3		1	3
Inadvertently placed carburetor mixture control in "full lean" or "idle cutoff" position	1	B		1		1		1
Closed ignition switch instead of turning fuel tank selector valve	2	B			2		2	2
Subtotal	18		1	1	17	3	14	19
Fuel Pump								
Failed undetermined	8	A	1		7	3	5	8
Pump diaphragm failure	1	A			1	1		1
Subtotal	9		1		8	1	5	9
Miscellaneous								
Pilot snapped throttle closed	8	B			8	1	7	8
Inoperative or inaccurate fuel gage	12	D			12	2	10	12
Excessive fuel consumption	5	C			5		5	5
Ran out of fuel	134	C	8	8	118	29	98	134
Used automobile gas	3			1	2	1	2	3
Took off with cool engine	5	B	1	1	3	2	3	5
Neglected engine during glide or other maneuvers	83	B	1	1	78	19	64	83
Failed undetermined	4	A			4	1	1	4
Subtotal	254		10	11	230	67	187	254
IGNITION SYSTEM								
Magneto								
Coil burned out	1	D			1		1	1
Points burned, condenser weak, distributor cap cracked	1	D			1		1	1
Insulation failure, bare wires grounded	1	D		1		1		1
Failed, undetermined	5				5		6	5
Subtotal	8			1	8	1	8	8
Sparkplugs								
Shorted out	1	D			1		1	1
Improper type	1	D			1	1		1
Failed undetermined	1	D			1	1		1
Subtotal	3				3	2	1	3

(Continued on page 34)

plant structure failures must be taken care of by remedy D—improved detail design, construction or maintenance.

Improvement must be worked out for each individual design of engine, and reliable operation depends as well on good maintenance.

Some structural failure will always be with us, but conditions are very much better with present day engines than they were ten years ago, and further improvement can be expected in the normal course of development.

Improvement can be accelerated, of course, by careful analysis of the accident records and by continuous, ardent effort toward betterment of details by engine manufacturers. It is probably done most easily by the continuous development of a single engine model over a period of years.

▶ **Fuel System**—Almost all of fuel system failures would have been lessened by improved detail design, construction or maintenance, but could be reduced by other means as well. Actually, the only ones which could be reduced by improved detail design alone are three failures resulting from air or vapor lock and six stemming from engine starvation when fuel supply was low.

With the exception of these items, it appears that practically all forced landings because of failures under the headings "fuel leakage" and "restriction of fuel flow" could be eliminated by remedy A—duplication of the fuel system.

Probably, primer failures could best be taken care of by remedy B, elimination of the primer. If use of a carburetor is to be continued, possibly an automotive type accelerator pump can be substituted for the primer.

If the fuel injection system is used possibly the injection can be made positive enough even at engine cranking speeds so that a primer will be unnecessary.

▶ **Carburetion Factor** — Under the heading "carburetor," which lists a total of 479 accidents, 442, or 92 percent, of the failures are ascribed to "ineffective carburetor heat" and "improper application of heat."

A carburetor incorporating automatic heat control would help this situation. It appears, however, that practically all *of these failures could have been prevented* by remedy B, *eliminating the carburetor and substituting a fuel injection system.*

It now seems to be recognized that presently obtainable fuel injection systems are free from the carburetor icing hazard. In addition, they eliminate two of the usual engine controls (heater and fuel mixture) in connection with the carburetor and of relieving the private pilot of the worries

Items of Consideration	Number	Suggested Remedy	Injury Index: Fatal	Serious	Minor—None	Damage: Washout	Major	Forced Landings
Other Ignition Failure								
Disconnected wire to sparkplug	1	D			1		1	1
Short circuit near battery installation	1	D			1	1		
Failed, undetermined	1	D		1		1		1
Subtotal	3			1	2	2	1	2
PROPELLER ASSEMBLY								
Improper installation or adjustment	4	D		1	3		3	4
Propeller failed in flight	8	D			6	1	4	8
Spinner came off in flight	3	D			3		3	3
Fiber piston broke	1	D			1		1	1
Loose piston	1	D			1			
Piston cylinder assembly thrust bearing failed	1	D			1		1	1
Push-pull control disengaged	1	D			1		1	1
Failed, undetermined	2	D		1	1	1	1	2
Subtotal	18			2	17	4	13	17
LUBRICATION SYSTEM								
Oil pump failed, undetermined	2	A			2		2	2
Oil screen plugged	1	A			1		1	1
Clogged oil line	2	A			2		2	2
Low oil supply	7	A		1	6	1	6	7
Low oil pressure	5	A		1	4	2	3	2
Oil pressure line failed	3	A		1	2	1	2	2
Faulty oil gage	1	A			1		1	1
Cracks in oil tank	2	A			2	1	1	2
Filler cap came off in flight	2	B			2		2	2
Drain plug came out in flight	4	A			4		4	4
Piston froze	4	A	1		3	1	3	4
Piston rings froze	1	A			1		1	1
Sticky valves	3	D			3		3	3
Connecting rod bearing burned out	1	A			1		1	1
Failed, undetermined	8	A			8	1	4	4
Engine froze	2	A			2		2	2
Subtotal	47		1	3	43	7	40	40
ENGINE ACCESSORIES								
Short circuit starter cable	1	D			1	1		
Starter teeth sheared off	1	D			1	1		1
Generator drive shaft sheared off	1	D			1		1	1
Subtotal	3				3	2	1	2
CONTROL SYSTEM								
Throttle control cable jammed	7	D			7	1	6	4
Throttle control cable broke	3	D			3		2	3
Throttle control wires broken	1	D			1		1	
Throttle cable housing broke	1	D			1		1	1
Throttle arm became disconnected	1	D		1			1	1
Subtotal	12			1	11	1	11	8
MISCELLANEOUS								
Engine overheated	2	D	1		1	1	1	2
Excessive oil consumption	1	D			1		1	1
Oil caught fire	1				1	1		1
Exhaust stack failed	1	D			1		1	
Undetermined	276		8	15	252	78	198	252
Subtotal	281		10	15	256	80	201	256
TOTAL	1352		36	80	1237	311	1043	1238

and decisions concerned with these and carburetor icing.

▶ **Fuel Injection Engines**—These have not as yet had sufficient use in actual service to establish them as being free from troubles. Only a few have been used in personal aircraft, but the Army Field Forces have had 509 in service for 1½ yr. and an additional 100 in service for ¾ yr., and an accurate service record has been kept.

It is evident from the Army record, and concurred in by the manufacturer of the engines, that the fuel injection powerplant requires a much finer fuel strainer than does the carburetor engine.

When a satisfactory strainer is provided and sufficient service experience obtained to enable elimination of other minor imperfections always found in a new development, it appears that the mechanical reliability of the fuel injection system should approximate that of the present carburetor.

Since about half of all of the determined powerplant failures were carburetion difficulties associated with mishandling the carburetor heat or with insufficient heat, the use of the fuel injection engine would appear to offer a very great improvement in safety.

▶ **Duplicate Systems**—Forced landings resulting from some other causes attributed to the carburetor, such as "contained dirt" or "air intake clogged" could have been prevented by remedy A, duplication of the fuel system. *Apparently all of the forced landings caused by carburetor failure might have been prevented by using both remedies B and A—two independent fuel systems, each with fuel injection.*

One such arrangement might have two individual fuel injection metering systems driven by separate gears. Each would have its own set of fuel lines and nozzles, and be fed by its own fuel tank and plumbing.

A single air intake manifold and air filter system could be used if it were provided with the usual spring-loaded emergency inlet in the event the air filter became clogged. Each injector system would be capable of providing sufficient fuel for full engine power.

In ordinary operation, however, both would be operating and each would provide only half the fuel required. A single throttle might be used to control both systems simultaneously, and arranged with a stop for the normal full power position, with each of the injection metering pumps operating at half capacity.

If either system failed the throttle could be pushed past the normal stop so that the other system could provide sufficient fuel for full power, or be adjusted for the power desired.

It appears likely that such an arrangement or in any event some duplicate fuel system, could be developed to a reliable state.

▶ **Fuel Valves**—These units, either through failure or mishandling, caused 69 of the accidents listed. Three were fatal. Twenty-six were caused by failure of the pilot to switch from an empty to a full tank. In 14 cases, the pilot took off with closed or partially closed fuel valves. And in 13 cases, the pilot confused the fuel shutoff valves with the carburetor heat control.

From this it appears that the *private pilot would be much better off if he had no fuel valve within his reach.*

The reason advanced for having a fuel shutoff within pilot's reach is that he should be able to close off the flow in event of an air fire. For 1947, there appears to be no record of a powerplant fire during flight that would have been helped by shutting off the fuel. But there were 69 accidents, including 3 which were fatal, that were caused by mishandling or failure of fuel valves.

Optimum fuel system for the personal plane would seem to be one having no valves whatever for the pilot to operate. If a shutoff valve were needed to stop the flow of a gravity system during maintenance work, it could be placed outside pilot's compartment.

Placed within his reach (as required by Civil Air Regulation), the valve should be provided *with a safety* or guard so that it is not likely to be used without deliberate intention, even though this added feature would give undesirable complication.

Under miscellaneous fuel system failures, 134 accidents are listed as "ran out of fuel." Probably most of these could have been prevented by unmistakable warning when a minimum safe quantity of fuel is left, with accurate indication of usable fuel thereafter.

The number of forced landings resulting from running out of fuel might also be reduced substantially by the use of duplicate complete fuel systems. It would be extremely unlikely that both tanks would run dry at the same moment. And one could be made larger by the amount of reserve fuel desired. An unmistakable signal would be necessary when the first tank was emptied.

▶ **Ignition**—In early gasoline engines the ignition system appeared to divide honors with the fuel system as a cause of engine failure. For 1947, with practically all personal aircraft engines fitted with twin ignition, only 18 accidents are listed under ignition failure as compared with 920 under fuel system failure.

Although present fuel systems give the pilot a much greater opportunity for mishandling than do ignition systems, undoubtedly the duplication of ignition is responsible to a substantial degree for its excellent record.

Further improvement is likely only through improved detail design, construction or maintenance, probably mostly by maintenance.

▶ **Propeller, Lube, Controls**—Most of the 19 prop failures are associated with controllable pitch units, just coming into general use in connection with personal planes and which should improve substantially as their service records increase.

Of the 47 accidents listed under lubrication system failure, it seems that possibly 40 might have been avoided if the engines had been fitted with duplicate lube installations, including oil pumps, reservoirs, and passages. The lube system is third largest source of powerplant failure, and consideration of duplicate systems might well be given serious attention.

For the 17 accidents listed under accessories, control systems and miscellaneous, the causes of which have been determined, it would seem that the only applicable remedy is improved detail design, construction or maintenance.

▶ **Conclusions**—Outstanding findings of the analysis show that:

Seven-eighths of the determined powerplant failures were associated with the fuel system.

Over half of the determined powerplant failures (549 out of 1077) could *have been prevented by the use of a properly functioning fuel injection system* instead of a carburetor.

Of the remainder, ⅓ might have been prevented by duplication of the system. These are made up of 131 cases in which the fuel system would be involved, and 40 involving the lubrication system. Work on means for accomplishing these duplications appears well worth the effort.

Next largest group consists of 139 cases in which pilot ran out of fuel. It would seem that a large proportion of these cases might have been avoided by provision of unmistakable warning when 1 hr. of fuel was left, with accurate indication thereafter.

Remedy of changing the basic method, or eliminating the item giving trouble, is applicable to 83 of the accidents (in addition to those involving the change from carburetor to fuel injection). These involve such items as eliminating (or guarding) the fuel valve in reach of the pilot, and eliminating the primer.

The rest consist of 126 cases, or 12 percent of all determined, that apparently could have been remedied only by improved detail design, construction or maintenance.

It appears that research is advisable to investigate the feasibility of developing satisfactory duplicate fuel and lubricating system arrangements for a typical personal plane engine. Plans are being made for such research to be conducted jointly by the Personal Aircraft Research Center and Gulberson Engine Testing Laboratory of the Texas Engineering Experiment Station.

"Atmosphere Chamber" For Field Tests

Field testing and calibration of aircraft cabin pressure instruments has been made feasible by 3 x 5 ft. "atmosphere chamber" test stand designed by AiResearch Aviation Service Co., 5907 Imperial Highway, Los Angeles 45, Calif. It's claimed that pressure regulator can be checked and calibrated with device in less than 2 hr. by skilled mechanic. Compactly mounted manometer tubes indicate atmosphere and cabin pressures and differential pressure between these two values. Stand requires only ordinary vacuum pump and 110 or 220v. current source for operation.

AIRLIFT

National security depends largely upon the full use of air power in all its phases. One vital operation is airlift—dramatically pointed up by the air supply of Berlin and more recently by food-rescue missions in the snowbound areas of the West

Fairchild has developed and produced cargo and troop transports designed for airlift. The C-119 *Packet*, soon to succeed the C-82 *Packet*, will further demonstrate the ability of the aircraft industry to meet the requirements of modern airlift tactics

An airborne signal team loads jeep and trailer carrying field radio equipment into the cargo hold of a Fairchild *Packet* Delivered to a forward air strip by experienced Air Force pilots, this unit will provide essential mobile signal service at an advanced base

FAIRCHILD ENGINE AND AIRPLANE CORPORATION
30 ROCKEFELLER PLAZA NEW YORK 20, N Y

Turbojet 'Simplicity' Is Design Complexity

Progressive additions to basic unit present major engineering problems.

By Robert McLarren

When the first news of the turbojet engine reached the layman,[1] he was told with great acclaim that this astonishing new engine had "only one moving part," the rotor, carrying the turbine and compressor At the time, wiser heads smiled at this simplification and said "Yes, but wait until the engineers get hold of it!"

In the ensuing five years the engineers have, indeed, "got hold of it" and the result is late models actually rivaling the reciprocating engine in complexity

The rapid increase in this complexity has attracted the serious attention of engineers, both engine and aircraft, and strong efforts are now being made to not only stop this trend but to simplify the turbojet engine installation insofar as possible But the many factors involved in the problem offer seemingly small hope of success in these efforts.

▶ **Aircraft Contributes**—Firstly, this increase in turbojet installation complexity is not all the fault of the engine The airplane itself has increased enormously in complexity, the brief post war period being responsible for nearly as much increase as the preceding 20 yr

For example, the generating capacity of the Douglas DC-6 is 33,600w in contrast to 11,200w in the DC-4 and 2800w in the DC 3

And the modern jet fighter incorporates cockpit refrigeration, radar equipment, ejection seat, fuselage dive brakes, remote-indicating instruments, windshield defrosting, power-operated trim tabs and a variety of fully-automatic devices, all of which were unknown to the fighter pilot of prewar years

It was to answer these power requirements, as well as those posed by numerous special semi and full-automatic controls that the turbojet has increased in complexity Thus, there is little question but what each additional accessory, device and control that has been added to it has been in response to a genuine need But it is the elimination of this "need" that requires the major attention

▶ **How Equipment Grew**—The "one moving part" turbojet of the early Whittle type was an excellent example of mechanical simplicity but, unfortunately, it was this very simplicity that created limitations on the engine's operation and performance

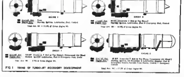


FIG 1 TREND OF TURBO-JET ACCESSORY DEVELOPMENT

One of the first steps was the addition of a throttle control that automatically compensated for altitude changes in air inlet temperature and density A turbine overspeed governor was added and it was early found necessary to install a fuel filter because of the serious effects of foreign matter on the burners

As service experience grew, an emergency fuel system was installed on all turbojets This installation was not altitude compensated since an "emergency" supply of fuel would only logically be necessary during takeoff, climb or in the landing approach However, new engines must incorporate an altitude-compensated emergency fuel system and, in addition, it must provide means for limiting acceleration and deceleration to prevent "blowout" or excessive exhaust temperature

A late requirement, too is an automatic starting device requiring no technique on the part of the pilot and which will prevent "hot starts" and their attendant hazards

One of the early complexities added to the turbojet engine was an adjustable exhaust nozzle Several devices have been developed experimentally These consist of either a movable "bullet" in the tailpipe or an adjustable nozzle area Although the practicality of these contrivances has not yet been proved (they were tried but abandoned on several jet fighters[2]), there is not much question but what they will be required in the future when operating conditions became more marginal

▶ **Performance Dictates**—Increased performance demands on the engine have contributed substantially to its increased complexity Since reduced fuel consumption, one of the major objectives, is obtained by increased pressure ratios and operating temperatures, these methods are being tried progressively with attendant increase in weight.

Next major addition to the turbojet will be turbine blade cooling[3] as soon as its enormous intricacy can be reduced sufficiently to permit practical application

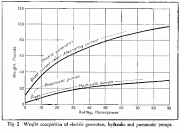


Fig 2 Weight comparison of electric generators, hydraulic and pneumatic pumps

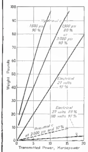


Fig 3 Graphic weight analysis of various aircraft distribution systems. Comparison is made on a basis of ability to deliver power over a distance of 100 ft at different pressures and efficiencies

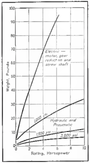


Fig 5 Graph for comparison of rating and weight of linear actuators for operating accessories

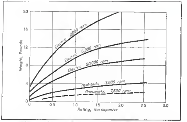


Fig 4 Rating and weight comparison of three types of continuous duty rotary motors

The greatly increased power provided by the turbojet over its predecessor piston engine has carried aircraft to new regimes of acceleration, altitude and maneuver that demand increased strength in engine bearings and mounting system and improved fuel and lubricating systems These high G loads and gyroscopic loads[4] have forced designers to increase structural strength and to replace many assemblies formerly made of light alloys with high strength steel

▶ **Two views**—One of the historic battles between engine and aircraft designers is the subject of accessories and who is responsible for what unit

The aircraft designer feels that all accessories are a problem for the engine designer, whereas the latter feels that his job is simply to deliver a basic engine his responsibility ending where the aircraft engineer's line attaches at the engine

While this so-called "battle" has been merely humorous interplay between the two interests, it has now become a question of major importance and one not easily resolved by even the most fair-minded engineer

It is now no longer a question of whose responsibility a certain system is, but rather a question of how a particular service can be supplied with a minimum of weight and complexity

▶ **Accessory Role Illustrated**—It is in the accessories that the complexity of the turbojet engine has assumed critical importance[5] Fig 1 illustrates this point clearly and indicates the rapid increase in size, weight and power requirements of accessories in turbojet installations

Engine A represents a bare power package, suitable for use as a "booster" engine that is, for the provision of thrust alone to the airframe The accessories installed are for the use of the engine alone and include only starting, ignition, lubrication, fuel and control system In this case the total weight of the accessories amounts to 11 6 percent of the engine weight

Engine B begins the addition of aircraft accessories, that is, sources of power required for the operation of equipment in the airplane foreign to the engine itself

In this engine there are added a generator and an accessory gear pad for the use of either a hydraulic pump or a vacuum pump according to the desires of the airframe designer

In addition an emergency fuel system has been added to the engine itself, making a total accessory weight of 12 9 percent of the engine weight

Engine C marks the use by the airframe engineer, of the source of high-pressure air contained in the compressor casing of the turbojet engine, and an air bleed is provided for this purpose Also, a fuel drain is added to prevent accumulation of fuel within the engine The output of the accessory drive has been increased 50 percent and all of these additions increase the weight of the accessories to 14 7 percent of engine weight

▶ **Engine Under Development**—Engine D is a type now undergoing development but represents an existing requirement and typifies the present situation

The aircraft accessory power has been increased another 13 percent and the engine features numerous additional items of equipment to answer requirements set forth by the customer (in this case the Navy Department).

This engine is equipped with its own oil reservoir a fuel booster pump, anti-icing equipment, a complete emergency control system and the addition of a variable area nozzle (Continued p 33)

All of this equipment adds up to 31.2 percent of the engine gross weight, or almost three times that of the original engine

It is also important to notice the increase in engine frontal area created by the addition of these accessories, making impossible the "slender nacelles" so long advanced as an unique attribute of the turbojet

This increase adversely affects the "thrust per unit frontal area" often used as a basic criterion of the turbojet in comparison with other types

▶ **Accessory Comparisons**—One of the approaches to a solution to this problem is a study of various types of accessory systems and the sizes and weights of their generating units.[6] In a comparison between electrical, hydraulic and pneumatic generating equipment, there is no question but what the pneumatic pump has the lightest weight per horsepower delivered.

This comparison is shown in Fig 2, which also indicates that although the pneumatic pump is extremely efficient at comparatively low power outputs, there are not available for comparison pneumatic pumps at power ratings above about 8 hp.

Next most efficient, on a lb/hp basis, is the hydraulic pump, which is 3½ times as light as the electric generator throughout its range of application

Most expensive in weight is the a.c generator, since it requires a constant speed drive and heavy condensers are sometimes needed.

From the point of view of the engine, alone, the pneumatic pump is the most efficient means of providing power for the airplane but a consideration of the power-generating unit alone does not provide a solution to the problem, for after leaving the engine the aircraft designer must consider the efficiency of utilization of this power within the airplane

▶ **Distribution Factors**—Fig 3 shows a comparison of the weight and power of various distribution systems for aircraft and here the picture is changed entirely

A high voltage electrical wiring system will transmit the same power at about ¼ the weight of a pneumatic system This advantage is lost, however, when lower voltages are used

Electrical wiring comprises about ¼ the total weight of an electrical system. It has considerable advantage, however, in its simplicity and flexibility of installation

After creating and distributing this energy, the designer has next the problem of efficient utilization, and Figs 4 an 5 examine the weight per horsepower of rotary and linear actuators

In Fig 4, types of continuous duty rotary motors are compared, with the pneumatic type showing the highest efficiency. The poorest efficiency is exhibited by the low-speed electrical motor with the efficiency improving as the speed is increased

Fig 5 compares the systems on the basis of their use in linear actuators and here the hydraulic and pneumatic systems are practically identical and in all cases far superior to the electric system The latter, in order to convert its energy into a mechanical linear action must employ a motor, a reduction gear and a jack, whereas the hydraulic and pneumatic systems need only a cylinder containing a piston

▶ **Combinations**—Even these comparisons are not sufficient to provide an accurate analysis of the various systems involved

For example, the hydraulic system requires a reservoir, the pneumatic system suffers impairment at altitude due to the low air density, the electrical system (d.c.) requires a reservoir in the form of a battery

For these reasons, engineers are going to combinations of these systems in their search for accessory system efficiency

Examples of these combinations include the use of electrically operated, remotely controlled selector valves in a hydraulic system, hydraulic pumps driven by small, high speed electric motors and an electric motor-driven air compressor for pneumatic bomb bay door operation

Even should comparisons of the various systems result, in a particular installation, in the selection of one as the most efficient, there now appears little doubt that two and perhaps three will be required in the future

Thus, electrical energy is necessary for the operation of radio equipment, many instrument and fire control systems, etc, whether it is an efficient method of power utilization or not

Availability of high pressure air in the compressor casing may eliminate the need for a pneumatic pump on the engine and provide high pressure air for cabin air conditioning, pressurization and the operation of units in which speed is important

The hydraulic jack remains an extremely efficient method of transmitting large amounts of energy, such as is required for heavy bomber landing gear operation. Its pressure-equalizing characteristic also makes it ideal for control boost systems, automatic pilot installations and similar uses as control units

▶ **Auxiliary Power**—Most engineers advance the auxiliary power unit as the most desirable solution to these problems.[7] It would remove all accessories from the engine and eliminate the heavy power drain that directly affects the performance of the airplane

However, size and weight of auxiliary powerplants prohibit their use in small, single-engine craft An alternative solution is the use of an accessory drive gear box remote from the engine and connected by a single shaft to a single power take-off pad on the engine.[8]

This would simplify the design problem of both the engine and aircraft manufacturer, since the engine designer could be relieved of the added weight, frontal area and complexity of the individual accessories and the aircraft designer could simplify the installation and maintenance of the powerplant while placing the accessories in a fuselage location more convenient both from an arrangement and an accessibility viewpoint

Solution is still sought for the effects of extremely high altitude on accessory systems, a problem on which there is little available data

Supersonic speed may also create additional problems in maneuvering loads and inertia effects on fluids within accessory systems

Obviously, aeronautical progress has intensified and multiplied the accessory problems of aircraft and engine designers and created needs for additional research and development work well beyond the already heavy burden of providing powerful efficient turbojet powerplants for our high performance aircraft

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Fastener Production Up

Tinnerman Products, Inc produced more than one and one-quarter billion of its speed nuts, clips and clamps during 1948. For the first time in its history Tinnerman produced better than 100,000 speed nuts a month Tinnerman is building new production facilities to add a speed nut grip retainer to its line The grip is aimed at eliminating welding, staking and clinching in many assembly techniques

NEW AVIATION PRODUCTS

Trend to Red

'Black light' yields to new illumination in several instances.

The trend is increasing among both airlines and airframe manufacturers towards red light for cockpit illumination in preference to the "black light" used heretofore. Most installations also incorporate white light in conjunction with the red.

Several carriers, among them Pan American Airways and American Overseas Airlines, have converted portions of their fleets to this type of lighting. The Boeing Stratocruiser, Douglas DC-6 and Convair-Liner are among the new planes being delivered with red-lighted cockpits.

It does not appear that any one company has undertaken to supply all the components required for red cockpit lighting in "package" form. However, the illumination currently installed in the Stratocruiser was studied, in cooperation with Boeing, by David Miller of the research lamp department at General Electric Co's Nela Park branch, Cleveland.

▶ War History—During the last war, the Army Air Forces conducted intensive experiments with red light to accustom night fighter pilots' eyes to extreme darkness and enable them to see as much as possible when looking away from their instrument panels. It was determined that light wavelengths of the order of 600 millimicrons or over were suitable for cockpit lighting purposes, although it appears, in some cases at least, that any red light which gives sufficient illumination has been used without particular regard to its exact color characteristics.

One particular facet of red cockpit lighting will bear careful study and evaluation in collaboration with flight crews. Red emergency handles and switches, under red light, appear either white or such a pale shade of red as to lose their signal effect almost entirely, while any writing done with a red pencil on white paper becomes almost, if not entirely, invisible under red light.

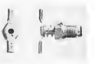
Therefore, crew members trained to look for red controls in an emergency might well become momentarily confused if controls were to appear white. It is highly important that a reliable method be devised to show up emergency controls vividly when red light is used. —G.C

Eye Protection

Improved goggle, stressing features of comfort and adjustment, is suitable for welding, cutting and brazing operations. Made by **General Scientific Equipment Co.**, 2700 W Huntingdon St., Phila 32, Pa, headset has standard 50 mm lenses (available in four shades) with cover glasses to protect against pitting. Molded plastic eye cups, joined flexibly for easy fit against face, have ventilating screens and baffle plates to prevent fogging and keep out flying particles and stray light rays. Goggle assembly is hinged from headrest by telescopic arms. Concealed springs hold goggles gently against face. Headrest, distributing weight over entire head, is light plastic, easily adjusted to head size. Sweatband is installed for added comfort.

Decibel Checker

New pocket-size meter, type 410-A, to permit quick, accurate measurements of noise levels, is offered by **Herman Hosmer Scott, Inc.**, 385 Putnam Av, Cambridge 39, Mass. Small size and simplified controls are claimed to enable high flexibility and ease of operation, with same performance as bulkier and more expensive models. Device, powered by hearing aid batteries with a normal operating life of 50 hr, covers range from 34 to 140 db above standard ASA reference level, and includes all three standard ASA weighting characteristics to duplicate response of ear at various levels. Meter is two-speed and provisions are made for using extension cable, optional types of microphones, vibration pickups, and analyzers or filters. Unit is 11½ in. long, 2¼ in. in diameter, and weighs slightly over 2 lb with batteries.



Quick-Action Drain Valve

To save valuable time in preflight checks, new type drain valve for fuel tanks, radiators, etc, developed by **Charles E Chapin Co**, East Rutherford, N J, requires but quarter turn to open or close. Positive locking action eliminates need for safety wire and permits operation with gloved hand. Valve consists of simple plunger located in cylinder, and in closed position strong spring keeps sealing ring tightly pressed against cylinder shoulders. For opening, plunger is pushed in against spring tension and quarter turn locks it. Liquid drains through four orifices into hollow plunger stem. Wide-span operating handle allows manipulation without getting fingers in flow. Material is brass, cadmium-plated. Available size is ¾-in. pipe.

Hand-Type Wire Stripper

To simplify aviation wiring jobs, pocket size stripper is announced by **Ideal Industries, Inc**, 5187 Park Ave, Sycamore, Ill. Device has cam action that releases jaws so that wire may be removed without crushing strands. By squeezing handles, wire is gripped, insulation cut, and wire stripped in one operation. With release of handle, grippers automatically free wire and jaws return ready for next cut. It's claimed there's no possibility of nicking or cutting the wire or fraying ends. Unit's light weight (10 oz) and finger pressure minimize fatigue. Four models handle all wires gages from Nos. 22 to 8. Blades are interchangeable.

J-47 Deliveries Start at Lockland

GE's new jet engine plant is fed by more than 170 subcontractors in most extensive program yet tried.

By Alexander McSurely

CINCINNATI—First two of the 2000 J-47 turbojet engines ordered by USAF from General Electric Co were delivered last week at ceremonies at the new GE jet engine assembly plant at Lockland, suburb of this city. The engines are the assembled products of more than 170 subcontractors.

The axial-flow turbine engines, which are rated at 5000 lb. thrust and power such first-string Air Force planes as the world's fastest fighter, North American's F-86, and the high speed Boeing B-47 bomber, are being built under a long-range industrial plan providing for rapid expansibility in event of emergency.

▶ Trial Pattern—Four principal subcontractors are Ryan Aeronautical Co., Solar Aircraft Co., Wright Aeronautical Corp., and Ranger division of Fairchild Engine & Airplane Corp. In a program calling for precision scheduling and ontime deliveries in mounting volume, these four and the other subcontractors are working out with GE a project which may form a pattern for much other military production in coming months.

Boeing, with its 37 percent subcontracting on the B-47 bomber, set a new mark on recent airframe subcontracting. But the GE program, with a majority of the J-47 work done by subcontractors, surpasses this.

▶ Production Peak—Charles E. Wilson, GE president and principal speaker at the industry gathering marking the first deliveries at Lockland, told the audience that U.S. production was unsurpassed, as demonstrated by World War II efforts.

"It would take 100 years for any other country to equal the record of 100,000 planes a year production," Wilson said.

He told reporters that he was confident Russia had no jet engine production comparable to that in this country, but pointed out that Russia had taken deliveries on British jets and had a large group of captive German jet engine experts.

GE expects to reach peak production (level undisclosed) early next year, with approximately 1200 persons employed at the Lockland plant. But the key assembly group in Cincinnati presumably could be expanded rapidly to a much larger force, taking over additional space in the huge war-built plant originally occupied by Wright Aeronautical Corp.

Auto Lite Corp. now occupies a major part of the other plant space, but would be required to release it for military production in emergency. Additional assembly output, of course, would require additional production by subcontractors on each of the many components.

Companies Report 1948 Sales Revenues

Eight aircraft companies have reported their sales revenues for the fourth quarter of last year as follows:

• Bellanca Aircraft Corp., $147,537. This compared with third quarter sales of $92,000, second quarter, $73,000, first quarter, $73,000. Total 1948: $385,537.

• Beech Aircraft Corp., $5,958,207. This compared with third quarter sales of $6,019,000, second quarter, $5,573,000, first quarter, $6,150,000. Total 1948 $23,700,207.

• Glenn L. Martin Co., $30,384,646. This compared with third quarter sales of $15,151,000, second quarter, $15,712,000, first quarter, $10,977,000. Total 1948 $72,224,646.

• North American Aviation, Inc., $25,616,860. This compared with third quarter sales of $54,500,000, second quarter, $20,073,295, first quarter, $14,487,900. Total 1948 $114,678,055.

• Republic Aviation Corp., $9,773,571. This compared with third quarter sales of $12,233,000, second quarter, $12,763,000, first quarter, $14,375,000. Total 1948 $49,144,571.

• United Aircraft Corp., $51,325,131. This compared with third quarter sales of $47,846,455, second quarter, $54,528,781, first quarter, $54,941,820. Total 1948 $208,642,187.

• Waco Aircraft Co., $7096. This compared with third quarter sales of $26,738, second quarter, $25,469, first quarter $36,915. Total 1948 $96,218.

• Wright Aeronautical Corp., $13,127,364. This compared with third quarter sales of $11,493,232, second quarter, $12,761,633, first quarter, $11,891,124. Total 1948 $49,273,353.

PRATT & WHITNEY BEGIN JET DELIVERIES

Pratt & Whitney technician gives production model Turbo-Wasps (JT-6B) a final check before delivery to Grumman Aircraft and Engineering Corp., for installation on the Panther (F9F) Navy jet fighter. P&W is making the Turbo-Wasp at East Hartford under license from Rolls-Royce on the basic design of the British Nene.

Latest Bid Awards to Industry by U.S. Air Force

For convenience of present and prospective Air Force suppliers, Air Materiel Command Procurement Division makes available to AVIATION WEEK the latest bid awards, shown below.

Requests for further information, or requests for lists of bid proposals, should be addressed to Contracting Officer, AMC, Wright-Patterson AFB, Dayton, Ohio, Attention MCPPSX2.

Abstracts of Contract Awards

For 486 static converters (Invitation for bid 49-80):
Electronic Measurements Co., Eatontown, N. J., on a bid of $51,072.

For 418 indicators (IFB 49-111):
Weston Electrical Instrument Corp., Newark, N. J., on a bid of $30,852.

For 8700 resistor assemblies (IFB 49-336):
Companies sharing—Ward Leonard Electric Co., Mount Vernon, N. Y., on a bid of $3544.20, Ohmite Mfg. Co., Chicago, Ill., on a bid of $311.29; Collins Radio Co., Cedar Rapids, Ia., on a bid of $889, and Concord Radio Corp., Chicago, Ill., on a bid of $788.

For 10,800 resistors (IFB 49-342):
Companies sharing—Continental Carbon Inc., Cleveland, Ohio, on a bid of $308; Ward Leonard Electric Co., Mount Vernon, N. Y., on a bid of $7718, Shallcross Mfg. Co., Collingdale, Pa., on a bid of $410; Clarostat Mfg. Co. Inc., Brooklyn, N. Y., on a bid of $188; Ohmite Mfg. Co., Chicago, Ill., on a bid of $875.79; Ohio Carbon Co., Cleveland, Ohio, on a bid of $145.30; Hardwick Hindle Inc., Newark, N. J., on a bid of $480 and P. R. Mallory & Co., Inc., Indianapolis, Ind., on a bid of $356.

For 700 field maintenance shelters (IFB 49-357):
Ionia Mfg. Co., Ionia, Mich., on a bid of $84,835.

For 99 lamp assemblies (IFB 49-362):
Crouse-Hinds Co., Syracuse, N. Y., on a bid of $42,132.50.

For 680 bus bar supports (IFB 49-435):
Martin Electric Co., Dayton, O., on a bid of $4082.40.

For 48,800 crystal units (IFB 49-489):
Standard Piezo Co., Carlisle, Pa., on a bid of $84,800.

For 84 wheel assemblies (IFB 49-518):
General Tire & Rubber Co., Akron, O., on a bid of $18,900.

For 45,300 gasket plug assemblies (IFB 49-583):
Linear Inc., Philadelphia, Pa., on a bid of $49,778.05.

For 40,000 resistors (IFB 49-580):
Continental Carbon Inc., Cleveland, O., on a bid of $2180.

For 178,673 bolt assemblies (IFB 49-578):
Companies sharing — Royal Machine Works Inc., Fort Wayne, Ind., on a bid of $1,812.80, Standard Pressed Steel Co., Jenkintown, Pa., on a bid of $640.09, Weatherhead Co., Cleveland, O., on a bid of $325; Aeroquip Corp., Jackson, Mich., on a bid of $18,565, Elastic Stop Nut Corp. of America, Union, N. J., on a bid of $408; Air Associates Inc., Teterboro, N. J., on a bid of $12,235.18; American Door & Machine Co., Los Angeles, Calif., on a bid of $485.70; Parker Appliance, Cleveland, O., on a bid of $328 and Aircraft Fitting Co., Cleveland, O., on a bid of $8500.

For 14,370 latch assemblies (IFB 49-580):
Companies sharing—Adams Rite Mfg. Co., Glendale, Calif., on a bid of $13,845.32; Carl D. Himes Inc., Dayton, O., on a bid of $8118.70; Illinois Lock Co., Chicago, Ill., on a bid of $857.50; Dayton Mfg. Co., Dayton, O., on a bid of $2332; Eagle Lock Co., Terryville, Conn., on a bid of $333.02 and Yale & Towne Mfg. Co., Stamford, Conn., on a bid of $176.80.

For 036 indicators (IFB 49-608):
Companies sharing—L. & R. Tool & Die Co., Detroit, Mich., on a bid of $137.12 and C. V. McClelland Co., Dayton, O., on a bid of $98.58.

For screws (IFB 49-620):
Companies sharing—Reed & Prince Mfg. Co., Worcester, Mass., on a bid of $12,452.16; Continental Screw Co., New Bedford, Mass., on a bid of $840.52; National Screw & Mfg. Co., Cleveland, O., on a bid of $185.58, and American Screw Co., Providence, R. I., on a bid of $84.86.

For 782 washer head screws (IFB 49-638):
Companies sharing — Continental Screw Co., New Bedford, Mass., on a bid of $163 and National Lock Co., Waltham, Mass., on a bid of $815.87.

For 900 sets, maintenance charts (IFB 49-834):
Con P. Curran Printing Co., St. Louis, Mo., on a bid of $2,504.

For 30,492 lb. photographic supplies (IFB 49-838):
Companies sharing—City Chemical Corp., New York, N. Y., on a bid of $538.82 and F. W. Berk & Co., Inc., Wood-Ridge, N. J., on a bid of $290.12.

For 40,000 fixed resistors (IFB 49-857):
Continental Carbon, Inc., Cleveland, O., on a bid of $3,252.50.

For 70,511 gal. ethyl acetate (IFB 49-891):
U. S. Industrial Chemicals Inc., Baltimore, Md., on a bid of $37,833.72.

For two hardness testing machines (IFB 49-708):
Wilson Mechanical Instrument Co., Inc., New York, N. Y., on a bid of $1,148.

For 700,850 yards cotton webbing (IFB 49-730):
American Cord & Webbing Co., Inc., New York, N. Y., on a bid of $77,806.78.

For 4450 (each) capacitors (IFB 49-224):
Companies sharing — Cornell Dubilier Electric Corp., South Plainfield, N. J., on a bid of $1272.78; Fisher Research Laboratory Inc., Palo Alto, Calif., on a bid of $1167; Federal Telephone & Radio Corp., Clifton, N. J., on a bid of $532; Ginke-Union, Inc., Milwaukee, Wis., on a bid of $672; Kings Electronics Co., Inc., Brooklyn, N. Y., on a bid of $660 and Concord Radio Corp., Chicago, Ill., on a bid of $1,726.

For 74,180 (each) capacitors (IFB 49-344):
Companies sharing — Sangamo Electric Co., Springfield, Ill., on a bid of $4,305.88, and Arrovox Corp., New Bedford, Mass., on a bid of $1,542.50.

For 6480 resistors (IFB 49-378):
Companies sharing—Herbach & Rademan Inc., Philadelphia, Pa., on a bid of $7,161.82 and Concord Radio Corp., Chicago, Ill., on a bid of $1080.

For 17 (each) hoist and trolleys (IFB 49-605):
Lagonda Tool & Engineering Co., Springfield, O., on a bid of $10,490.

For 97,588 lb. chemicals (IFB 49-672):
Companies sharing—City Chemical Corp., New York, N. Y., on a bid of $3740.34; Conray Products Co., New York, N. Y., on a bid of $24,435.12 and Mallinckrodt Chemical Works, St. Louis, Mo., on a bid of $125.55.

For 200,000 nuts (IFB 49-308):
Companies sharing—National Screw & Mfg. Co., Cleveland, O., on a bid of $549.00; Elastic Stop Nut Corp. of America, Union, N. J., on a bid of $15,230.00; Arro-Bolt & Screw Co., New York, N. Y., on a bid of $3638 and Air Associates, Inc., Teterboro, N. J., on a bid of $77.85.

For 580 transformers (IFB 49-124):
Companies sharing—Federal Telephone & Radio Corp., Clifton, N. J., on a bid of $397.28; United Transformer Co., New York, N. Y., on a bid of $350; Concord Radio Corp., Chicago, Ill., on a bid of $583.31; Collins Radio Co., Cedar Rapids, Ia., on a bid of $578 and Reiner Electronics Co. Inc., New York, N. Y., on a bid of $479.40.

For 60,000 yd. nylon parachute cloth (IFB 49-781):
Cheney Bros., Manchester, Conn., on a bid of $38,100.

For 30,000 yd. cheesecloth (IFB 49-712):
Chicopee Mfg. Corp., New Brunswick, N. J., on a bid of $3,175.

For 3387 aircraft cushions (IFB 49-733):
W. A. Apple Textile Mfg., Inc., Dayton, O., on a bid of $13,062.65.

For 54,500 ft. rubber tubing (IFB 49-858):
Companies sharing—Baldwin Rubber Co., Pontiac, Mich., on a bid of $7046.70; Quaker Rubber Corp., Philadelphia, Pa., on a bid of $7059; Ideal Rubber Co., Brooklyn, N. Y., on a bid of $728 and U. S. Rubber Co., New York, N. Y., on a bid of $288.

For 40,000 lb. potassium dichromate (IFB 49-887):
Conray Products Co., New York, N. Y., on a bid of $27,727.90.

For 20 control exposure lens (IFB 49-898):
Fairchild Camera & Instrument Corp., Jamaica, N. Y., on a bid of $4912.

For an order of photographic powder (IFB 49-588):
Philip A. Hunt Co., Brooklyn, N. Y., on a bid of $78,590.21.

For 18,467 couplings (IFB 49-892):
Companies sharing — Arc Equipment Corp., Bryan, O., on a bid of $8285.81 and Jack Pearl Screw Machine Products, Inc., New York, N. Y., on a bid of $733.48.

For adherent hose (IFB 49-865):
Companies sharing—Nez-Dur Co., Chicago, Ill., on a bid of $7402.83 and General Luminescent Corp., Chicago, Ill., on a bid of $7302.

For Blue Print line proof prints (IFB 49-337):
B. L. Makepeace, Inc., Boston, Mass., on a bid of $640.

For 1,000,000 sets printed forms (IFB 49-316):
Richter McCall & Co., Chicago, Ill., on a bid of $6192.

For 2700 plugs (IFB 49-387):
Companies sharing—American Phenolic Corp., Chicago, Ill., on a bid of $787.72 and Cannon Electric Development Co., Los Angeles, Calif., on a bid of $1785.20.

For 60,014 lb. aluminum alloy tubing (IFB 49-980):
Reynolds Metals Co., Louisville, Ky., on a bid of $113,018.81.

For 130 (each) antenna assemblies (IFB 49-801):
John Brown University, Siloam Springs, Ark., on a bid of $4238.38.

For 400 (each) actuator assemblies (IFB 49-327):
Aircraft Equipment Inc., Los Angeles, Calif., on a bid of $27,312.

For 37,400 ft. cable (IFB 49-341):
Companies sharing—American Steel & Wire Co., Cleveland, O., on a bid of $8030 and Federal Telephone & Radio Corp., East Newark, N. J., on a bid of $3720.

For 7680 (each) red marker globes (IFB 49-359):
Companies sharing—Holophane Co. Inc., New York, N. Y., on a bid of $3103.49 and Pyle-National Co., Chicago, Ill., on a bid of $2350.30.

For 1200 yd. nylon cloth (IFB 49-444):
General Textile Mills, Inc., New York, N. Y., on a bid of $5000.

For 5810 (each) outlet & tube (IFB 49-479):
Companies sharing—Electric Industrial Equipment & Supply Corp., Baltimore, Md., on a bid of $2108 and Line Material Co., East Stroudsburg, Pa., on a bid of $9078.

For 181,280 ft. flexible cord (IFB 49-480):
Collyer Insulated Wire Co., Pawtucket, R. I., on a bid of $5,136.92.

For 4000 (each) lamp assemblies (IFB 49-530):
Companies sharing—Revere Electric Mfg. Co., Chicago, Ill., on a bid of $13,250 and Line Material Co., Milwaukee, Wis., on a bid of $84,525.

For 22,030 (each) attachable light (IFB 49-542):
Manhattan Lighting Equipment Co., Inc., New York, N. Y., on a bid of $24,288.78.

For 317,720 lb. aluminum alloy (IFB 49-593):
Permanente Products Co., Oakland, Calif., on a bid of $186,128.48.

For 28,200 lb. aluminum alloy ingots (IFB 49-931):
Bohn Aluminum Brass Corp., Detroit, Mich., on a bid of $48,323.88.

For 61,110 each bushings (IFB 49 328)
Companies sharing—Weatherhead Co., Cleveland O on a bid of $3334 40 and Imperial Brass Mfg Co. Chicago Ill. on a bid of $411 72
For 12 each kit assemblies (IFB 49-080)
Luscombe Airplane Corp Dallas Tex., on a bid of $8232 33
For 20 each compressors (IFB 49-382)
Davey Compressor Co, Kent O, on a bid of $20,300
For 118,680 each screwdriver bits (IFB 49-694)
Plomb Tool Co Los Angeles Calif, on a bid of $20,228 70
For 181,465 lb. aluminum alloy sheet (IFB 49-117)
Permanente Products Co Oakland Calif on a bid of $44,428 32
For 280 each reciprocating sanders (IFB 49-723)
Sterling Tool Products Co Chicago Ill. on a bid of $32 030
For 1,202,100 lb. chrome steel sheet (IFB 49-758)
Sharon Steel Corp. Sharon, Pa. on a bid of $184,105 04
For 70 each aerial film dryers (IFB 49-733)
Morse Instrument Co Hudson O., on a bid of $74 251 34
For 308 925 lbs. manila rope (IFB 49 786)
American Mfg Co St Louis Mo on a bid of $132 715 29
For 3610 each measures (IFB 49-787)
Companies sharing—Huffman Mfg Co. Dayton, O on a bid of $10 294 49 and Petroleum Equipment Co Dallas Tex on a bid of $613 07
For 11,424 lb wood plastic fibre (IFB 49 810)
Super products Inc. Des Moines Iowa on a bid of $3312 98
For 31,600 bushings (IFB 49-638)
Companies sharing—Twain Tool & Mfg Co, Inc Chicago Ill. on a bid of $3036 42 Pacific Piston Ring Co Los Angeles Calif on a bid of $2335 Aircraft Fitting Co Cleveland O. on a bid of $4080 Parker Appliance Co Cleveland O on a bid of $323 58 and Weatherhead Co Cleveland O on a bid of $1153
For an order of steel chrome nickel (49-778):
Companies sharing—The Carpenter Steel Co Reading Pa on a bid of $2742 29 Ohio Stainless & Commercial Steel Co Cleveland O on a bid of $1481 31
For 30,880 each only self-locking (49-818)
Elastic Stop Nut Corp of America Union New Jersey on a bid of $2519 24
For 80,841 feet RF cable RG-58/U (49-842)
Federal Telephone and Radio Corp., East Newark N J on a bid of $3331.83
For an order of sheet rubber (49-852)
The B F Goodrich Company Akron, Ohio on a bid of $31 088
For an order of bearing-balls (49-1023)
Companies sharing — General Motors Corp. New Departure Div Bristol Conn on a bid of $2615 and Marlin-Rockwell Corp., Jamestown N Y on a bid of $3559
For 8130 each envelope-engine protective (49-1083)
Vensal Products Inc Tomah Wis on a bid of $65 379 30
For 800 each starter assembly (49-1083)
American Metal Refining Co Detroit Michigan on a bid of $21 900
For 10 brush lacing sets (49-887)
Companies sharing—Joseph Weidenhoff Inc. Algona Ia on a bid of $8374 Sun Electric Corp Chicago Ill on a bid of $3023 and York Supply Co Dayton O on a bid of $1909 23
For 200 dozen packages of photographic film (49-1021)
Ansco Chemical & Film Corp Newton N J, on a bid of $4956 72
For 53 900 lb glue (49-1014)
Polymer Chemical Co Cincinnati O, on a bid of $6061 15
For varied photographic equipment, (49-1019)
Companies sharing — Fiberbilt Sample Case Co New York, N Y, on a bid of $64 Salem Camera shop Dayton O, on a bid of $665, Keystone Mfg Co., Boston Mass. on a bid of $37 30, Bausch & Lomb Optical Co. Rochester N Y, on a bid of $109, Buhl Optical Co., Pittsburgh Pa., on a bid of $1074 Camera Equipment Co New York N Y, on a bid of $2139 Wollensak Optical Co Rochester N Y on a bid of $184.55 Simpson Optical Mfg Co, Chicago Ill on a bid of $332, Devry Corp Chicago Ill on a bid of $733, Chess-United Co, Inc. New York N Y on a bid of $408, Eastman Kodak Co Rochester N Y on a bid of $180 53 and Burke & James Inc., Chicago Ill. on a bid of $3184 53
For an order for adapter assemblies (49-1373)
Companies sharing — Parker Appliance Co., Cleveland O, on a bid of $2295 Deutsch Co Los Angeles Calif., on a bid of $333 Pacific Piston Ring Co, Los Angeles Calif, on a bid of $800, Aircraft Fitting Co., Cleveland O, on a bid of $1270 Weatherhead Co Cleveland O, on a bid of $3075 Elastic Stop Nut Corp of America Union N J on a bid of $1519 75, Air Associates Inc. Teterboro N J on a bid of $21 293 52 Monadnock Mills, San Leandro Calif on a bid of $328 Dzus Fastener Co Inc Babylon N Y on a bid of $385.52 and John A Roebling's Sons Co Trenton N J on a bid of $122 29
For 400 each trennion assemblies (IFB 49-842)
Companies sharing — Wells All-Steel Products North Hollywood Calif, on a bid of $480 and Paramount Steel Corp Long Beach Calif. on a bid of $3028
For 30 020 ft gasoline hose (IFB 49-845)
Anchor Rubber Co Dayton O on a bid of $28 052 30
For 20 000 ounce silver solder (IFB 49 810)
Handy & Harmon New York N Y on a bid of $31 602 98
For 2,101 800 ft aircraft cable (IFB 49-104)
Companies sharing — Electric Auto-lite Co Port Huron Mich. on a bid of $147 78 and General Motors Corp Warren O, on a bid of $11 273
For 305,100 yd cotton webbing (IFB 49 103)
Companies sharing — Southern Weaving Co Greenville S C, on a bid of $12 335 Phoenix Trimming Co. Chicago Ill. on a bid of $82 442 80 American Cord Webbing Co. New York N Y, on a bid of $4245 and General Textile Mills Inc New York N Y on a bid of $18 359 58
For 850 each receptacle assemblies (IFB 49 308)
Cannon Electric Development Co Los Angeles Calif on a bid of $1771 88
For 38 000 lb cotton waste (IFB 49-332)
Miller Waste Mills Inc Winona Minn on a bid of $4142 30
For an order for chemicals (IFB 49-812)
Companies sharing—City Chemical Corp New York N Y on a bid of $318 and Allied Chemical & Dye Corp New York N Y on a bid of $1444 83 and Anderson Prichard Oil Corp Oklahoma City, Okla on a bid of $11 846 03
For 1000 each flour dredgers (IFB 49-328)
York Supply Co Dayton O on a bid of $2380
For an order for camouflage lacquer (IFB 49-934)
Companies sharing—W P Fuller & Co Los Angeles Calif on a bid of $732 38, Sherwin Williams Co Cleveland O on a bid of $64 982 76 and Glidden Co Cleveland O on a bid of $3330 88
For 7810 lb asbestos tape (IFB 49 872)
Raybestos Manhattan Inc., Manheim Pa. on a bid of $6081 19
For an order for airduct hose (IFB 49-880)
U S Rubber Co, New York, N Y, on a bid of $2815.50
For 1131 each light assemblies (IFB 49 593)
Grimes Mfg Co Urbana O on a bid of $41 532 90
For 25,002 sq ft rubber sheet (IFB 49-912)
Companies sharing—B F Goodrich Co Akron O, on a bid of $12 800 Hewitt-Robins Inc, Buffalo N Y on a bid of $1190 and Armstrong Cork Co. Lancaster Pa., on a bid of $133
For 400 each aircraft starters (IFB 49-965)
Bendix Aviation Corp, Teterboro N J on a bid of $40,038 48
For 3000 each lead thermocouple (IFB 49-1022)
Lewis Engineering Co Naugatuck, Conn, on a bid of $3425
For 300 each blackboards (IFB 49-1018)
Ohio Valley Bldg Co Cincinnati O, on a bid of $8480
For 80 each indicator assemblies (IFB 49-881)
Revere Electric Mfg Co Chicago Ill on a bid of $2832
For 9100 each connectors (IFB 49-452)
Companies sharing—Kings Electronics Co Inc Brooklyn N Y on a bid of $11,287 50 American Phenolic Corp Chicago Ill on a bid of $847 and U S Radio Supply Chicago Ill on a bid of $810
For 14,200 each dispensing sheet (IFB 49 488)
Rehr-Manning Corp Troy N Y on a bid of $12,731 28
For 400 each material receptacles (IFB 49-511)
Grayhar Electric Co Inc, Dayton, O, on a bid of $6114 32
For professional services on technical data (IFB 49 581)
De Jur Amsco Corp. Long Island City N Y on a bid of $6088 48
For eight each power supply assemblies (IFB 49 548)
Eltron Inc Jackson Mich, on a bid of $10 451 20
For 1200 each electric heaters (IFB 49-889)
Companies sharing—Edwin L. Weigand Co Pittsburgh Pa on a bid of $8853 29 and Industrial Engineering & Equipment Co St Louis Mo on a bid of $402
For 900 each grinder assemblies (IFB 49-560)
Companies sharing—Morse Instrument Co Hudson O on a bid of $128 311.47 and Fairchild Instrument & Camera Co, Jamaica N Y on a bid of $28 838 20
For electric assemblies (IFB 49-827)
Companies sharing—Grayhar Electric Co Dayton O on a bid of $4619 48 and Westinghouse Electric Supply Co Dayton O on a bid of $826 28
For 722 each bronze bars (IFB 49-820)
George J Fix Co Dallas, Tex on a bid of $1452 58
For 725,000 sq in plastic sheet (IFB 49-858)
Hubbell & Miller Co, New Rochelle N Y on a bid of $4650 26
For 894 dolly and cradle assemblies (IFB 49-834)
Rockwell Engineering Co, Blue Island Ill on a bid of $69 640
For dehydrating agents (IFB 49-869)
Companies sharing—Joliet Chemicals Inc Joliet Ill on a bid of $34,976 18 and Davison Chemical Corp Baltimore, Md on a bid of $42 930
For 700 each transformer lights (IFB 49-899)
Companies sharing—R. B. Dooley, Inc. New York N Y on a bid of $1780 Fairbanks Morse & Co Cincinnati, O, on a bid of $1640 and W M Welch Mfg Co. Chicago Ill on a bid of $924
For 3195 gal coating material (IFB 49-867)
Brooklyn Varnish Mfg Co Brooklyn N Y on a bid of $12 616 10
For 150 each propellers (IFB 49-193)
Columbian Bronze Corp. Freeport N Y on a bid of $3998 86
For 20,850 lb. brass welding rods (IFB 49-735)
Revere Copper & Brass Inc. Detroit, Mich on a bid of $12 644 08
For 4233 lb composition wire brass (IFB 49-124)
American Brass Co Waterbury Conn on a bid of $3292 98
For 400 each tank gages (IFB 49-738)
Companies sharing—American Brake Shoe Co., Rochester N Y on a bid of $10 412 and DeVilbiss Co Toledo O on a bid of $1586
For 9818 lb solder (IFB 49-140)
North American Smelting Co. Inc Philadelphia Pa. on a bid of $4078 12

Nonskeds Ask Aid of Justice Dept.

Scheduled lines, in newspaper ads, criticize irregulars who reply with charge of antitrust law violation.

The nonscheduled airlines, which are putting up a tooth and-nail fight against stringent new economic regulations proposed by CAB, are diligently cultivating an alliance with the Justice Department. They have called on Attorney General Tom Clark to investigate alleged flagrant violations of the Sherman Antitrust Law by the certificated carriers.

What nettled the nonskeds were full-page newspaper advertisements challenging the irregular operators' safety standards and accusing them of law violations. The National Independent Air Carriers, an association of about 60 nonskeds, replied with a charge that the 32 scheduled lines sponsoring the ads had engaged in an "act of conspiracy in restraint of trade." The nonskeds said the advertisements were another step in the certificated airlines' campaign to put all independent operators using transport-type equipment out of business.

▶ **Appeal to Public**—Under the heading, "What is the Government's Policy in Regard to Enforcing the Civil Aeronautics Law," the certificated airlines' newspaper advertisement noted that the irregular operators have been soliciting support from Congress, the National Defense Establishment and the Justice Department. "Ostensible purpose of this solicitation is to save these carriers and to allow them the right to free enterprise," the certificated airlines declared. "Actually, their purpose is to enlist the aid of the government departments to continue their present operating procedure which, in many instances is in violation of the law."

Before giving support to the irregular operators, government agencies and the public were urged to ask the nonskeds such questions as "Do the members of your group conduct their operations at all times in accordance with the law? Are you required to operate under the same safety standards as the regular certificated airlines? Are your pilots required to have the same amount of experience as that required by the regular certificated airlines? In the event of accident do you carry sufficient insurance to protect the families of your passengers? What is the comparable safety record of your group and that of the regular certificated airlines?"

▶ **Nonskeds Reply**—James Fischgrund, vice president of Standard Airlines, a transcontinental nonsked, replied for the Nationsl Independent Air Carriers. He said NIAC members operate "in accordance with our understanding of the law and the meaning of reasonable regularity of service."

Safety standards of large nonscheduled airlines engaged in air coach services are the same as those of the scheduled airlines, Fischgrund continued. "The only differences in operating requirements have no relation to safety but pertain solely to operating on a fixed route as against an unfixed route. Pilots of larger nonscheduled coach lines, like those of the certificated carriers, are required to have an air transport rating.

"Insurance of between $25,000 and $50,000 per passenger is carried by large nonscheduled airlines. We believe this is more than the average insurance carried by the certificated operators."

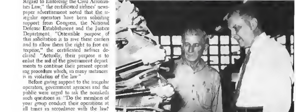
▶ **Safety Comparison Unavailable**—Fischgrund said that according to CAB no comparable figures are available with respect to certificated and noncertificated airline safety records.

In rebuttal, the Standard Airlines executive asked the certificated carriers "Why, after 20 years of subsidy paid by the taxpayers, can less than 10 percent of the people afford to fly the subsidized scheduled airlines? Why, when operating costs and requirements of certificated and noncertificated lines are practically the same, can the non certificated companies make a profit at practically rail coach rates without subsidy?"

▶ **Justice Dept. Stand**—In the recent two-day oral argument before CAB on the proposed revision of the nonscheduled exemption, the Justice Department took a strong stand in defense of irregular operations. It asked the Board to hold hearings to determine the facts before adopting the contemplated new regulation.

The Justice Department said that both airfreight and air coach service have developed largely through the irregular carriers' efforts. "Because of competition by the nonskeds, the public is receiving many benefits, and the certificated carriers have been forced to improve their service.

"For example, the big certificated airlines have offered reduced 'family plan' fares as a result of this competition. Baggage handling has been speeded up, expensive reservation services have been eliminated and even



TWO PAN AMERICAN VETERANS

Juan T. Trippe (right), founder and president of PAA, and Adam Krabk, assistant foreman in engine overhaul, discuss the "old days" Krabk has been a PAA employe since 1927, year the carrier was founded. Both veterans met when Trippe and his board of directors inspected Pan American Airways' Miami, Fla., overhaul base, largest commercial airline maintenance base in the world.

competitive coach rate services with elimination of free meals has been offered to customers, a large portion of whom would not use air transportation at all were it not for the existence of cheaper coach flights"

▶ **Certificated Carriers Criticized**—The Justice Department declared flatly that certificated carriers, finding the business developed by the irregular lines has become profitable and substantial, are now trying to divert this business to themselves and to exclude the irregular carriers from the traffic thus developed.

"Continued operation of large irregular air carriers is in the public interest as a yardstick for measuring the possibilities of profitably performing nonsubsidized service It is believed that the subsidized certificated carriers have little incentive to curtail extravagances in the absence of competition"

▶ **Regulation Too Stringent**—The proposed new nonscheduled regulation is so stringent as to be tantamount to a prohibition against effective irregular operations, the Justice Department asserted. It said the scope of irregular operation would be so narrowed as to prevent the handling of a substantial volume of traffic, thus rendering continuance of nonscheduled service economically impossible

Emory S Land, president of the Air Transport Assn., replied that the Justice Department apparently was putting its own economic theories about air transportation ahead of effective law enforcement He declared that "the function of the Department is to insure respect for and conformity with the law"

Survey Discloses Travel Habits

The airlines during 1949 will continue to bite far more deeply into the vacation travel market than before the war.

Recent survey taken among 1968 subscribers to the American Magazine disclosed that 6 percent of those polled plan to use the airlines for vacation trips this year In 1948, 5 percent used air travel for vacations, in 1947 and 1946, 7 percent, and in prewar years only 2 percent

▶ **Automobiles Preferred**—A whopping 82 percent of the vacationists in 1949 plan to travel by auto, 18 percent by railroad (10 percent using Pullman), 7 percent by bus and 2 percent by ship (the figures add up to over 100 percent because some people will use more than one form of transportation)

Asked if they would use air travel if they were to take a trip across the continent or to Europe, 55 percent of the men and 53 percent of the women said yes By age groups, "yes" answers to this question numbered 63 percent in the 20-25 year old category, 60 percent in the 26-35 year old category, 54 percent in the 36-45 year old category and only 43 percent in the 46 year old group and above

▶ **Reasons for Traveling by Air**—Of the persons inclined to travel transcontinentally or to Europe by air, 92 percent of the men and 90 percent of the women gave time-saving as a reason. Other motives for using air travel comfort, men 15 percent, women 13 percent, economy, men 8 percent, women 6 percent, avoid seasickness (to Europe), men 5 percent, women 3 percent; "would like experience," men 3 percent, women 6 percent, convenience, men and women 4 percent, and safety, men 3 percent, women 1 percent.

Among persons not inclined to use the airlines for traveling coast-to-coast or to Europe, 25 percent of the men and 33 percent of the women felt they would be more likely to enjoy a boat trip across the Atlantic Other reasons for not using air travel planes are unsafe, men and women 21 percent, don't care to fly, men and women 17 percent; prefer to travel leisurely, men 15 percent, women 11 percent, plane travel too expensive, men 11 percent, women 9 percent, can see scenery from auto, men 8 percent, women 11 percent, prefer boat if there is time, men 4 percent women 3 percent; avoid air sickness, men 3 percent, women 2 percent

No North Atlantic Examination Until '52

Pan American Airways' case for acquisition of American Overseas Airlines' certificate and property will not be transformed into a broad re-examination of the entire North Atlantic route pattern as requested by TWA and CAB public counsel.

The Board announced last week that it would expand the merger proceeding sufficiently to permit necessary modifications in the three North Atlantic flag routes if the PAA-AOA deal is approved But it decided that a thorough reassessment of U S North Atlantic air operations should wait until 1952, as previously planned

▶ **Employes Group to be Heard**—CAB said that the American Overseas Airlines employes' group, which announced plans to buy their company (Aviation Week, Feb 14), should be permitted to intervene in the PAA-AOA proceeding

The employes' request to the Board for dismissal or postponement of the case was denied

Previously, Pan American had lashed out at interests who allegedly were using delay tactics to kill PAA's proposed acquisition of AOA It described the AOA employes' petition as "the most comprehensive collection of smear attacks made on PAA over the last ten years ever to be bound together under one cover" Prepared by former CAB Chairman James M Landis, the petition said about 200 AOA flight and ground personnel had already pledged $1-million to counter Pan American's offer

▶ **PAA Tactics Hit**—The Landis-written petition specifically asked CAB to inquire into Pan American's past policies, "its efforts to crush competitors and its tactics aimed against established governmental aviation policy," which opposes the chosen instrument The AOA employes asked for a reasonable time to submit an offer to purchase American Overseas "on terms financially more attractive than those offered by PAA and under conditions which will protect the public interest in international air transportation"

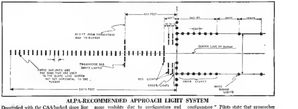
An AOA purchase price of "something less than $12 million" would be fair and reasonable, according to the employes' petition, Pan American immediately retorted that it would pay at least $18,845,000 (in PAA stock) for American Overseas

PAA said that granting of petitions by TWA and CAB public counsel to turn the AOA acquisition case into a study of the whole North Atlantic route pattern would drag the proceeding out for years Pan American noted that CAB Chairman Joseph J. O'Connell, Jr., recently invited the airlines to submit merger proposals as one important method for correcting problems in the existing route structure

▶ **Case Tests CAB Policy**—The present PAA-AOA proposal is the first to be submitted to CAB since the chairman's statement "This case will provide the test of whether the Board really means to give the carriers a chance to propose voluntary changes or whether it prefers to rely exclusively on administrative compulsion" Pan American declared

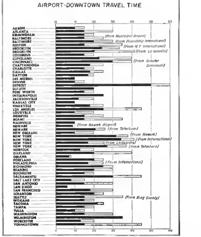
CAB public counsel replied that investigation of the whole North Atlantic route pattern as part of the AOA-PAA merger case would lengthen the proceeding by no more than five months "Such a delay in a case involving this country's most important international routes can hardly be said to be unreasonable if it appears to make possible the working out of a sounder and more rational route pattern," public counsel declared

AOA employes should be allowed a reasonable time to arrange for and submit a proposal for acquisition of their company, in public counsel's opinion



ALPA-RECOMMENDED APPROACH LIGHT SYSTEM

Dissatisfied with the CAA-backed slope line system of high intensity approach lights, the Air Line Pilots Assn has recommended the layout shown above The pilots group reports CAA will install the suggested system at one of the major U S airports for flight testing in comparison with the slope line setup. ALPA claims its layout will give the pilots safer directional indication and more visibility due to configuration and concentration of lights where they are most needed in approach and landing Note the transverse bar 1900 ft inbound and the well marked threshold ALPA system employs about one-half the lights necessary for the slope line, and, according to ALPA, "will eliminate the inherent confusion now found in the slope line's twin row, funnel-shaped configuration" Pilots state that approaches with extremely low visibility in fast four-engine equipment leave no time for determination whether the break out is over the left or right hand row of the slope line. If a portion of the single line system above is sighted, problem of lining up the runway is immediately solved for the pilot, ALPA claims.



Possible reductions in travel time between major airports and the downtown areas of cities they serve after completion of limited access express highways is shown in the above chart Time now consumed during peak traffic periods is illustrated in the total length of the bars above. Time which can be saved through construction of better roads is represented by the shaded areas of the bars

How Long From City to Plane?

Extent to which the valuable hours saved by fast air transportation are being chipped away by slow ground travel time between airports and the downtown areas of the cities they serve has been pointed up in a new study made by the American Road Builders' Assn

A survey of 59 airports in major U S cities has disclosed that 49 of the fields are 20 minutes or more from the center of their respective communities And 23 of the 59 fields are 30 minutes or more distant from downtown areas.

Seventeen of the airports studied are 10 miles or more from the adjacent city. Forty-six of the 59 fields are more than five miles from the center of town

▶ **Express Highways Needed** — The American Road Builders' Assn claims ground travel time can be cut an aver-

age of one-third by proposed limited access express highways

ARBA notes that a plane trip from Detroit to Cleveland requires about 54 minutes in the air But the traveler must spend 100 minutes—nearly twice as long—to complete the tedious ground trip to and from the respective airports in the two cities

A Los Angeles to San Francisco flight may require less than two hours in the air Yet persons making the trip also must figure in the 75 minutes it takes to cover the 26 miles of highways which connect the airports with downtown areas

▶ **Cities Aware of Problem**—ARBA states that city officials and highway engineers in many cities are keenly aware of the problem and are working out plans to curb the serious time lag on many airport-to-downtown roads Some of these plans will become reality in the next few years

Los Angeles plans to cut off about 21 minutes—or nearly 50 percent—from the 45 minutes currently required in ground travel from its principal airport to the business center of the city Present estimates also call for reducing the 30 minute travel time between the center of San Francisco and its new airport to 18 minutes

▶ **Problem at Willow Run**—Detroit has two alternatives for solving its problem One, now in process of completion, is the development of Wayne County Major Airport This field will be 18 miles from downtown Detroit, compared to 32 miles for Willow Run Airport State highway engineers are executing a five-year plan which will provide an express-type highway through the heart of Detroit to its major airports.

Another plan is to develop a field across the Detroit River in Windsor, Canada, making travel time 10 minutes between Cadillac Square and Windsor International Airport This compares with the 60 minutes now required between downtown Detroit and Willow Run during peak traffic hours

▶ **Improvement Seen**—Prospects for bringing about vast improvements in the highway systems serving major U S airports are bright, according to ARBA But the Association cautions that optimism is warranted only if local officials give A-1 priority to development of air port expressways

ARBA adopted a resolution at its recent 46th annual convention asking all units of government to expedite construction of airport-to-city links It called for allocating to the expressways a proper proportion of federal aid highway funds which may be available for road development in urban areas

Hawaiian Islands Get New Carrier

Hawaiian Airlines last month lost its exclusive right to conduct regular inter-island passenger air service when CAB certificated a former nonscheduled operator over competitive routes in the Territory of Hawaii

Agreeing with recommendations made by a Board examiner last summer (Aviation Week, Aug 23). CAB authorized Trans-Pacific Airlines to fly from Honolulu to the islands of Hawaii, Molokai, Lanai, Maui and Kauai for a five year period TPA was certificated to carry passengers and cargo, but, unlike Hawaiian Airlines, will not carry any regular mail.

TPA President Ruddy Tongg

▶ **Nonsked Violators Rebuked**—In certificating Trans-Pacific, CAB lashed out at carriers "which accept authorization for (and pretend to operate) irregular air services while engaging illegally in regular scheduled air transportation" Hawaiian Airlines had contended that Trans-Pacific was unfit to receive a certificate because of a U S District Court finding that TPA during 1947 had operated a regular daily service while presumably a nonscheduled carrier

CAB said the court's finding that TPA had violated the Civil Aeronautics Act should be considered seriously But it added that Hawaii's need for additional service was of paramount importance in this case—and TPA was the only applicant proposing passenger operations

▶ **No Reward for Wrongdoers**—The Board emphasized that it "does not intend to reward wrongdoers by granting certificates to carriers which have undertaken illegal operations for the alleged purpose of developing evidence to prove the need for a service As against other applicants that had proved their fitness to perform a proposed service, such a violator would find himself in a certificate proceeding burdened with a disadvantage which—under ordinary circumstances—would be inimical, if not fatal, to his case"

CAB observed that Hawaiian airlines instituted a number of improvements in its service about the time Trans-Pacific and other irregular operators came into the picture after the war

In the spring of 1946, Hawaiian reduced its fares to an average of 6 5 cents a mile, expanded its facilities and obtained additional aircraft. But in February, 1948, a few weeks after Trans-Pacific discontinued all common carrier operations in compliance with a court injunction, Hawaiian Airlines raised fares to 7 5 cents a mile CAB admitted the fare increase may have been a coincidence rather than the result of TPA's termination of service

▶ **Cargo Decision Deferred**—While granting a certificate to Trans-Pacific, CAB deferred decision on the application of Trans-Air Hawaii for an all-cargo certificate until the carrier can file reports covering six months' operations with C-46 equipment The freight line flies on schedule under a Board exemption It began service in July, 1946, with C-47s, but when operations with this type equipment continued in the red the carrier switched to C-46s last September

In certificating Trans-Pacific, CAB emphasized that Hawaiian Airlines' service had not been inadequate. The Board pointed out, however, that the Territory's dependence on only one certificated airline is "fraught with grave significance in the event of any catastrophe which would disrupt service"

▶ **Profits Cited**—Certification of a second carrier will not seriously impair Hawaiian Airlines' ability to render reasonably adequate and economical service, CAB asserted The Board noted that from 1943 through 1947 Hawaiian showed an average net profit before taxes of $369,000 annually—an average return on investment of 27 percent

CAB noted that practically all passenger transportation between the islands is conducted by Inter-Island Steam Navigation Co and its subsidiary, Hawaiian Airlines

▶ **Shift to Air Travel**—Because of the decline in inter-island passenger travel by ship, Hawaiian Airlines, in effect, now provides the only transportation available, CAB declared In 1941, the last prewar year, 162,665 persons traveled between the islands by ship, compared to 48 855 by plane In 1947, only 13 059 traveled by ship against 349,050 by plane

President of Trans-Pacific Airlines is Ruddy F Tongg, Honolulu business man

NAL Finances Still Critical

Tentative 1948 net loss topped $1.5 million; CAB offers higher mail rate but refuses to drop route probe.

National Airlines' headaches are continuing despite settlement of the 10-month-long pilots strike last November and arrival of the usually lush winter traffic season

The carrier's last hope of getting CAB to dismiss its investigation to determine whether NAL's routes and property should be transferred to other airlines apparently has faded CAB recently reiterated its refusal to drop the probe, and a hearing in the case is slated to begin this week

National has repeatedly challenged the Board's legal authority to conduct the investigation and has said the case seriously impairs the company's efforts to improve its current shaky financial position

▶ **Profit Reported**—Aided by a large retroactive mail payment, NAL reported a $265,375 domestic operating profit on a 40 9 percent load factor in November last month of the strike In December, company's overall net income for both domestic and foreign services was $60,685, and load factor advanced to 43 5 percent.

In January, NAL's net profit was $152,252 based on a 84 6 percent passenger load factor

During the first three weeks of February passenger load factor for National was 54 4 percent

But for 1948 as a whole, National suffered a tentative $1,717,703 net loss on domestic operations and lost another $158,000 on its international run to Havana, Cuba Finding that the carrier's financial condition was still critical, CAB last week offered NAL $337,000 more mail pay for the period July 14 1947, to Dec 31, 1948, and proposed a higher mail rate for the period starting Jan 1, 1949

President G T Baker said the December profit was achieved in the face of increased costs of fuel, labor and materials These expenses are continuing to rise

▶ **Labor Costs Soar**—Last month, NAL and the International Assn of Machinists signed a new contract providing a $20 monthly wage increase for about 500 clerical, office and station workers, retroactive to Dec 1, 1948 In January, National and IAM agreed on a 10 cents an hour wage boost for all classifications of maintenance workers (Aviation Week, Jan 17)

Meanwhile, National's program of putting Air Line Pilots Assn members back into the cockpits following settlement of the strike has fallen behind schedule As a consequence, in accordance with the strike settlement pact the carrier has been given base pay to ALPA personnel not restored to flying duty

▶ **Bad Feeling Persists**—A dispute between ALPA and National has arisen over ALPA's demand that the returning pilots take physical examinations While the issue has been arbitrated, it pointed up the continued bad feeling between ALPA and NAL.

Former non-union pilots still with National are attempting to gain recognition for their new union—the National Pilots Assn—as collective bargaining agent for NAL flying personnel ALPA, which regards NPA as a company union, is set to fight the move As of last month, NPA members apparently outnumbered ALPA personnel on National's payroll

▶ **Executives Take Salary Cut**—With their company far in the red, National's top executives took a cut in income last year, recent statements to CAB have disclosed

President Baker, who owns 22 47 percent of NAL's outstanding stock, reported total 1948 salary of $26,250 against a $30,000 salary as reported for the year 1947

J C Brawner, treasurer, earned $9 375 last year compared to $10,000 in 1947, J D Crane, vice president maintenance, $10,225 against $10,800 in 1947, H C Dobbs, vice president-sales, $13,749 against $13,999, R P Foreman, secretary, $8625 against $9000; E J Kershaw, vice president-operations, $14,999 against $15,124 F E Howe, assistant secretary and assistant treasurer, $6900 against $7200, and T A Prevost, assistant vice president, $9375 in 1948 against $8124 in 1947

▶ **Mail Pay Boost Eyed**—National still hopes to wipe out part or all of its losses during 1948 when it receives a final mail rate for the year. This summer and fall, when traffic on NAL's Florida run would normally be at low ebb, the company plans to stimulate business with bargain fares

From May 15 to Nov 1, NAL passengers will be able to buy roundtrip tickets between Florida cities and northern points for only one third more than the present one-way fares Travel on National's DC-6 flights is included in the low fare plan subject to the normal DC-6 surcharge Eastern Air Lines, NAL's competitor on the Florida run, is making similar cuts on roundtrip tickets starting May 15

SHORTLINES

▶ All American — Plans to inaugurate conventional feeder service between Washington and Pittsburgh via Baltimore, Frederick, Hagerstown, Md, Martinsburg, W Va, Cumberland, Md, and Connellsville-Uniontown, Pa, on Mar 7, between Pittsburgh and Atlantic City, N J, via Johnstown, Altoona, Harrisburg, Lancaster, Pa, Wilmington, Del, and Philadelphia on Mar 28, and between Washington and Atlantic City via Baltimore, Dover, Del, and Bridgeton Millville Vineland, N J, on Apr 11 AAA planned to suspend pick-up service to six Pennsylvania communities Mar 5 and intends to discontinue pickup operations on its Pittsburgh-Philadelphia link (route 49F) Mar 26

▶ American—Has set up a special safety division headed by Robert W Knight, former director of operations analysis Company has flown a record four billion passenger miles without a passenger fatality AA flew 1,913,400 freight ton miles in January up 48 percent over the same 1948 month

▶ American Overseas—Grant Titsworth has been named secretary treasurer

▶ Braniff—Plans to inaugurate Houston to Rio de Janeiro service Mar 8, with DC-6s making the flight in 26 hrs, 25 min The Lima, Peru, to Rio hop will be nonstop Carrier is offering a new credit plan for domestic and Latin American travel

▶ Capital—Has placed a 24-passenger DC-3 in experimental service between Norfolk, Va, and Knoxville, Tenn, to test passenger acceptance Plane has a loading door with built in steps, baggage racks near the door and a male attendant instead of a stewardess Other Capital DC-3s are undergoing similar modification (AVIATION WEEK, Jan 24)

▶ Mid-Continent—CAB has suspended for 90 days pending investigation tariffs filed by MCA and TWA providing roundtrip excursion fares between Kansas City and St Louis which were 26 percent less than regular roundtrip fares

▶ Pioneer—With the help of a $119,532 net profit in 1948, the feeder now shows an overall profit of $8900 for its first 41 months of operation ending Dec 31, 1948

▶ Post Office—Has inaugurated air parcel post service to France.

▶ TWA—Ralph S Damon, president, has been elected a director of Goodyear Tire and Rubber Co, subject to CAB approval

▶ United—Flew an estimated 81,498,000 revenue passenger miles in January, up 22 percent over the same 1948 month UAL directors have declared the regular quarterly dividend of $1 125 per share on the company's cumulative preferred stock Dividend is being paid from capital surplus Carrier has withdrawn the tariff which would have given clergymen a 25 percent fare discount

CAB SCHEDULE

Mar 7—Hearing on Board's investigation of National Airlines route transfer (Docket 3528)

Mar 8—Prehearing conference on All American Airways Pittsburgh-Charleston, W Va, route case (Docket 3610)

Mar 9—Hearing on Board's enforcement proceeding against Transocean Air Lines (Docket 3544)

Mar 14—Prehearing conference on extension of Empire Airlines feeder certificate. (Docket 3649)

Mar 14—Hearing in reopened Mississippi Valley and Southeastern States area cases. (Docket 548-501 et al)

Mar 21—Hearing in Florida trunkline service case. (Docket 2216 et al)

Mar 22—Hearing on TWA's complaint against Pan American Airways Saudi Arabian service (Docket 2264)

Mar 28—Hearing in New England states route case. (Docket 3196 et al)

Mar 28—Hearing on Board's enforcement action against Nats Air Transportation Service. (Docket 3486)

Apr 11—Hearing in reopened Hawaiian case. (Docket 851 et al)

Apr 13—Hearing on Board's investigation of through service and interchange requirements at St. Louis and Memphis. (Docket 3433)

May 2—Hearing on additional southern transcontinental service. (Docket 1102 et al.)

May 16—Hearing on Hughes Tool Co. control of TWA. (Docket 2796)

Sightseeing Extended

Capital Airlines' sightseeing flights over Washington, D C, which began Jan 30, have proved so successful they are being extended to other cities on the company's system

After two weekends of experimentation at Washington, Capital added Pittsburgh to the sightseeing circuit on Feb 13 Other cities will be included when equipment is available

J H Carmichael, Capital's president, states that the Sunday flights are often patronized by men who fly frequently but want to show their wives that air travel is safe and pleasant

On the first day of its $2.50 sightseeing flights over Washington, Capital made two trips with 50-passenger DC-4s, carrying 41 and 44 passengers on the hops Next Sunday three trips were made with full 50-passenger loads on each flight Sixty-seven passengers were carried on two DC-4 flights at Pittsburgh the first Sunday sightseeing trips were offered there

Wanted: More Traffic

Baltimore, the nation's sixth largest city, is taking steps to improve its 48th place ranking among U S passenger generating points The city's Junior Assn of Commerce recently called in representatives of nine airlines serving Baltimore in an effort to develop a suitable program to stimulate public interest in commercial air passenger and cargo transportation

Opening of Baltimore's new Friendship International Airport, scheduled late this year, is expected to promote air travel Meanwhile, the Junior Assn of Commerce has proposed the airlines provide the Baltimore public with a joint information bureau under one phone number to supply flight information The carriers were also asked to publish a consolidated flight schedule.

Landis Joins Firm

Former CAB Chairman James M Landis has joined the Washington law firm of Gewirtz and Maclay. During Landis' term as Board chairman, Gewirtz was his executive assistant Maclay was CAB's assistant general counsel at the same time Name of the law firm has been changed to Landis, Gewirtz and Maclay

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UNUSUAL OPPORTUNITIES
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SEARCHLIGHT SECTION
of
AVIATION WEEK

STRICTLY PERSONAL

A WAIL FROM EGGBEATER HEAVEN—"We had one here that's for the books," writes **Capt Robert C Sellers**, of the Liaison Helicopter Training Group at San Marcos, Tex.

"This is the only military helicopter school in the U S and around Texas it's known as Eggbeater Heaven Some weeks back a dry spell ended with torrential rains Near Houston 14 hunters got stranded on an island They were in danger of drowning as the waters slowly crept up toward them So one of our ships went to the rescue

"Now, anyone will admit flying a copter 150 miles is no fun, and a very tired pilot arrived on the scene several hours later. He immediately landed near the men to start taking them off one by one Did he rescue them successfully? Hell no! Only one of them would dare get in the damned thing! They sweated out an Army duck jeep Result—1 man out of 14 saved by the air age, and 13 by the Willys man I guess we'd better leave the program to DC 3s and DC-4s for persuading millions to fly until we convince people that those four blades on top aren't for hanging out Monday's wash!"

* * *

DEATH OR DRAKE?—Here is stark tragedy in the skies According to the Delta Digest, a Delta captain recently noted on a maintenance report at the end of a flight "Check large dent in right side of nose section Look under 'remarks' for explanation" Here were the remarks

"This dent was caused by a mid-air collision with a large female duck about 3 miles west of Spartanburg It is the considered opinion of the crew that evasive action was in progress and she did not see the DC 3 approaching Or, she committed suicide rather than permit herself to be overtaken by a large drake who was seen to pull up just in time"

WRIGHT FIELD'S BOX TOP PRIZES—You never know where this aviation research business will land you Take **Adam J. Stolzenberger.** He is civilian chief of the dynamic model unit at Wright Field Been working on complicated problems of flutter and vibration in fixed-wing aircraft for years and darned if he doesn't come up with a new breakfast food prize soon to be available to air minded small fry who send in the box tops

You see, Mr Stolzenberger got the idea for a wing-flapper that flies He calls it an ornithopter Actually, the wings of his wire and silk-paper models don't fly or flutter. They flap The flutter (or flap) is produced by an unbalanced rotor that sets up a 12-cycle-per-second vibration, and which is actuated by that old standby of the model builders, a powerful rubber band motor

Properly wound up and launched, the models will flap from 30 to 50-ft Mr S believes the same principles can be used in larger models with electric or gasoline power, foresees serious structural complications in any ornithopter built on this principle large enough to carry a man. In a larger craft, the design would probably call for a series of small wings, he believes

R.H W

WHAT'S NEW

New Books

"Fear, War, and the Bomb," Military and Political Consequences of Atomic Energy, by P M S Blackett Some interesting fuel for the controversy now raging on air tactics and strategic bombing is contained in this volume by a British Noble Prize-winning physicist Considerable analysis of air warfare in the last war and discussion of its role in the atomic war of the future. Whittlesey House, 330 W 42nd St, New York 18, N Y Price $3 50

Trade Literature

"How to Make Money on an Airport," an informative booklet available from State of Tennessee Bureau of Aeronautics, Nashville, Tenn, upon request.

"Aluminum Alloy Castings," folder-size booklet on their production and application, available upon request to Aluminum Industries Inc, Cincinnati 25, Ohio

"Mainliner Flight Plan," a booklet distributed to airline travelers on "behind the scenes" flight operations Available upon request to United Air Lines, Chicago 38 Ill

"Murex Limited," a booklet presenting a brief outline of Murex metallurgical and chemical products, available from Murex Ltd, Rainham, Essex, England

"Jessop High Speed Steels," a booklet describing the analyses, heat treatments, and applications of five most commonly used types of high speed steels Available upon request to Jessop Steel Co, Washington, Pa

"Permite Aluminum Castings," a booklet on their production and application, available upon request to Aluminum Industries, Inc, Cincinnati 25, Ohio

"How Spring Wire Is Used," a pocket-size sales training booklet, available upon request to Market Development division, American Steel & Wire Co, Rockefeller Bldg, Cleveland 13, Ohio

"Catalog-Data Book," covering industrial and marine fittings, available upon request to Thomas Laughlin Co, Portland, Me

New Films

"A Big Race for Little Wings," two-reel sound movie on the Goodyear Trophy Race at the 1948 Cleveland Air Races Available upon application to Public Relations Dept, Goodyear Tire and Rubber Co., Akron, Ohio

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EDITORIAL

No Gains Without Safety

The Flight Safety Foundation is unique in aviation. Nothing like this nonprofit, independent educational group has existed before. In a field of transportation that has suffered so much from accident misinformation or unnecessarily sensational publicity, the Foundation has a tremendous task.

To date, financial aid has been disappointing. The Foundation's fund raising program is continuing with little fanfare or promotion, but the goal for 1949 is at least $100,000.

An official summary of the accomplishments of the Foundation in its first few months of active life is encouraging. This light is made available by the Foundation's director, Jerome F. Lederer, from the headquarters at 515 Madison Ave., in New York City:

1. It has established an experience interchange service which provides the aviation industry with a channel for exchanging data on accidents, near-accidents, training procedures and related safety information. The improved operational practices developed by one aircraft operator are thereby made known to other operators and to the aircraft manufacturers. This information exchange also has spurred dissemination of accident prevention information within the individual organizations.

2. It initiated a forum where aeronautical engineers and aircraft operators met in a two day conference to exchange ideas on internal company policy as related to safety. Representatives of foreign and domestic airlines as well as aircraft manufacturers and the military services participated in the forum. The results were fruitful, especially in relaying methods for safety education and analysis of operations from the viewpoint of safety.

3. Accurate reports on accidents are necessary to provide educational material and prevent recurrence. Responsibility for investigation of many aircraft accidents is being delegated by the CAB to state police or state aviation agencies. The Foundation organized and conducted a seminar for the training of civilian aircraft accident investigators, the first of its kind in the country and probably in the world. This was accomplished with the assistance of experts furnished by CAB and CAA. Lieut. Gen. George E. Stratemeyer cooperated in providing the facilities for the seminar at Mitchel Air Force Base.

4. The Foundation has assisted the Coast Guard in advising transocean operators of the search and rescue organization at hand when a ditching occurs at sea and has published the procedures recommended for use by captains of a merchant vessel when an airplane prepares to ditch in his vicinity.

5. After learning that one airline was using Coast Guard pilots to train its pilots in ditching, the Foundation spurred the use of Coast Guard pilots to train other airline pilots in ditching procedures.

6. The Foundation has produced the first integrated study of scientific methods for evaluating flight crew requirements for large transport aircraft. This project, an outgrowth of a great deal of prior study, was sponsored by certain airlines and carried out in cooperation with other interested organizations.

7. The Foundation has signed a contract with the CAA to develop this study further.

8. It is working with other organizations on development of safety programs applying particularly to private flying. Like the Automotive Safety Foundation, the Flight Safety Foundation will work with whatever organization is best suited to accomplish a particular project.

9. It has established a research project to study cockpit simplification and reduce causes of fatal accidents in small private aircraft. This project was financed in memory of Richard H. Depew, a leading exponent of safety in private flying. A preliminary report on this project will be available soon.

10. The Foundation is constantly analyzing accident data to show where safety efforts are likely to produce maximum results and it helps other organizations accelerate their safety projects so that practical safety measures will not be allowed to migrate, but rather be propelled into adoption.

This is an impressive record for less than a year's operation.

Already, a number of public spirited individuals and companies have contributed to this nonprofit, impartial group dedicated to the advancement of knowledge for safety in flight.

Contributors to date include these leaders: Alexander & Alexander (insurance), American Airlines, Beech Aircraft, Boeing Aircraft, Braniff Airways, William A. M. Burden, Capital Airlines, Colonial Airlines, Connecticut General Life Insurance Co., Continental Air Lines, Delta Air Lines, Sherman Fairchild, The Friendship Fund, Mrs. L. Carteret Fenno, Grumman Aircraft Engineering Corp., Los Angeles Airways, National Aviation Corp., Edward J. Noble, Ohio Oil Co., Pan American-Grace Airways, Laurance S. Rockefeller, Sportsmen Pilots Assn., United Air Lines, Standard Oil Co. of California.

These contributors are worthy of commendation. It is regrettable that their number is so small. At this date the goal for 1949 appears distant, and unattainable. But we have more faith in aviation's leaders than to believe the Foundation will fail to win its rightful support from those it will serve best. In aviation there are no gains without safety.

ROBERT H. WOOD

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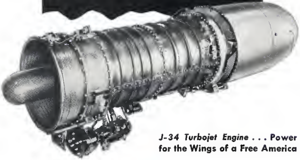

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